Canada : Agriculture, Dept. of.

(PUBLICATION No. 767)
TECHNICAL BULLETIN No. 52

ISSUED JUNE, 1945
FIRST PRINTING

DOMINION OF CANADA—DEPARTMENT OF AGRICULTURE

An Economic Study of Land Settlement in Representative Pioneer Areas of Northern Saskatchewan

R. A. STUTT *and* H. VAN VLIET

MARKETING SERVICE—ECONOMICS DIVISION
Dominion Department of Agriculture

in co-operation with

DEPARTMENT OF FARM MANAGEMENT
University of Saskatchewan

Published by authority of the Hon. JAMES G. GARDINER, Minister of Agriculture,
Ottawa, Canada

7M—8121—6:45

PUBLICATION No. 767
TECHNICAL BULLETIN No. 52

ISSUED JUNE, 1945
FIRST PRINTING

DOMINION OF CANADA—DEPARTMENT OF AGRICULTURE

An Economic Study of Land Settlement in Representative Pioneer Areas of Northern Saskatchewan

R. A. STUTT *and* H. VAN VLIET

MARKETING SERVICE—ECONOMICS DIVISION
Dominion Department of Agriculture

in co-operation with

DEPARTMENT OF FARM MANAGEMENT
University of Saskatchewan

Published by authority of the Hon. JAMES G. GARDINER, Minister of Agriculture,
Ottawa, Canada

7M—8121—6:45

FOREWORD

This study, undertaken by the Economics Division, Marketing Service, Dominion Department of Agriculture, in co-operation with the Department of Farm Management, University of Saskatchewan, presents a picture of economic and living conditions in the pioneer areas of northern Saskatchewan. Such a study is particularly timely and useful. More than any other, it is a section of the province where farming exhibits peculiar economic problems and where constructive governmental policies are urgently required. The large amount of detailed information assembled and analysed in this report will be of great assistance toward a clear understanding of those factors which determine the well-being of the people located in the area in question.

The study is timely because it has been made available when matters of post-war reconstruction and rehabilitation of discharged service personnel are being considered. The special problems of the northern pioneer settlers must, and undoubtedly will, form an integral part of provincial reconstruction plans, and the suitability of available land for settlement in this area for re-establishment purposes needs to be carefully appraised. Inasmuch as the unoccupied lands of the province are located in the same soil-climate zone as those which are included in this survey, the results of the present study provide a guide to future settlement.

There is another respect in which a study of this kind has considerable value. A record of the progress and economic status of farmers at this early stage of settlement can be usefully compared with the results of a similar investigation at any future time. This would, of course, be true of any such survey in any part of the province. But in order to secure the full advantage of recorded development an early start is highly desirable.

The bulletin is well illustrated with excellent photographs, a fact which deserves special mention. These illustrations supplement the text in an effective manner and thereby contribute very materially to the value of the publication.

L. E. KIRK,
Dean of Agriculture,
University of Saskatchewan.

TABLE OF CONTENTS

29976—2½

List of Tables

List of Figures

AN ECONOMIC STUDY OF LAND SETTLEMENT IN REPRESENTATIVE PIONEER AREAS OF NORTHERN SASKATCHEWAN

R. A. STUTT (1) and H. VAN VLIET (2)

INTRODUCTION

Settlement in the northern pioneer areas of Saskatchewan has occurred mainly since 1931. To a large extent it resulted from the series of crop failures in the prairie regions of the province which coincided with the period of world-wide depression after 1929. Drought and soil drifting conditions, resulted in the depletion of the financial resources of prairie farmers. Many of those located on lands marginal and submarginal for wheat production, and some of those farming in districts ordinarily considered to be fair farming areas, came to the conclusion that farming under these conditions was a hopeless task. Accordingly a new trek of land seekers developed, and, as suitable arable land was not to be found in the prairie regions, many of these farmers moved into the wooded regions of the Prairie Provinces.

The land seekers associated with this new search for land were unique in that they were not the usual type of pioneer, always desiring to be on the fringe or frontier of settlement. Most of these farmers were prairie farmers with a considerable period of farming experience in prairie agriculture. For these settlers, unacquainted with farming practices in a wooded and semi-humid region, many new agricultural problems developed. Serious hardships in obtaining a livelihood, and the further discouragement resulting from the slow rate of progress in bringing the forested land under cultivation, forced many of them to accept relief and re-establishment aid before they were able to bring their holdings to a stage of productivity capable of supporting a minimum standard of living.

Purpose of Study

In 1941 the Economics Division, Marketing Service, Dominion Department of Agriculture in co-operation with the Department of Farm Management, University of Saskatchewan, undertook a study of the problems of land settlement in northern Saskatchewan. During the summer months of June, July and August a random sample survey was made of 304 farm businesses in the Albertville-Garrick area.[3] This area extends from a point approximately 20 miles north and east of Prince Albert to Garrick, 20 miles west of Nipawin. In 1942 the program of study was extended and during the summer of that year a total of 687 farm business records were obtained in eight other representative areas of northern Saskatchewan. Together, these studies give a representative picture of the agricultural development of the pioneer fringe region of the province.

---

[1] Assistant Agricultural Economist, Dominion Economics Division.

[2] Professor of Farm Management, University of Saskatchewan.

The authors desire to acknowledge the advice and guidance of Dr. C. C. Spence, Economics Division, Dominion Department of Agriculture, Edmonton, and Dr. E. C. Hope, formerly Professor of Farm Management, University of Saskatchewan. Acknowledgment is also made of the assistance of W. J. Anderson, P. J. Thair and R. G. Knowles of the Economics Division and R. McIver, L. Oddie, B. E. Murphy, F. Mullins, and F. Snell in carrying on the field work and in the analysis of the data.

[3] An Economic Study of Land Settlement in the Albertville-Garrick Area of Northern Saskatchewan. E. C. Hope and R. A. Stutt, Processed Bulletin, Dominion Department of Agriculture, Ottawa.

The general objective of these surveys was to study the problems of land settlement in the wooded region of Saskatchewan and to show the economic factors associated with agricultural development. The specific purposes may be enumerated as follows:—

(1) To measure the progress of settlers in the northern pioneer region.
(2) To isolate factors related to the progress of settlement, for example, the rates of clearing and breaking of scrub and bush lands, productivity of the predominant soils in northern pioneer areas and sources of outside income available to settlers.
(3) To appraise possibilities of settlement in these regions for providing a net income sufficient for a reasonable standard of living, including the determination of the minimum area of crop land required on different grades of land and the adequacy of the quarter-section farm unit.
(4) To provide information as a basis for policies aimed at the rehabilitation of returned soldiers and the resettlement of families from the submarginal land areas of the province.
(5) To determine the amount and kinds of capital required at different stages of settlement and the amount of settlement aid necessary for effective settlement.

As future expansion of settlement in Saskatchewan will be largely confined to the northern wooded region the results of these settlement studies should be of considerable value in the shaping of land settlement policies.

The economic data pertaining to the use of land, progress in bringing the land under cultivation, and the financial progress of settlers, was supplemented by a Level of Living Study,[1] directed towards the sociological aspects of settlement in the wooded region.

Method of Study

This study was conducted by the survey method. Visits were made by trained enumerators to settlers throughout the selected areas. There was no purposive selection of settlers showing the greatest amount of success or of those showing poor success. Approximately one-quarter of all the settlers in the areas surveyed were included in the sample. As a satisfactory proportion of the total population was obtained in the sample, the results of the study may be considered to be representative and significant.

The eight representative areas included in the 1942 survey comprised four districts in the northeastern, and four in the northwestern parts of the province. A total of 384 records was obtained for the four districts in the northeast and 303 for those in the northwest.

Sources of Data

Settlers co-operated generously in supplying information relating to their farm businesses. The farm business year was taken as from May 1, 1941, to April 30, 1942. The data enumerated included a summary of the utilization of land, inventories of real estate, equipment, livestock and other assets of the settler, an inventory of liabilities and a summary of the sources and amounts of all receipts and expenditures for the business year. In addition information was obtained on the net worth of the settler at the time he started on his farm, the farming and occupational experience of the settler, the crop yield history of the farm, and the progress made in the clearing and breaking of land. Information

[1] The Level of Living of Families in the Pioneer Areas of Northern Saskatchewan. (Unpublished.) Economics Division, Marketing Service, Dominion Department of Agriculture and the University of Saskatchewan.

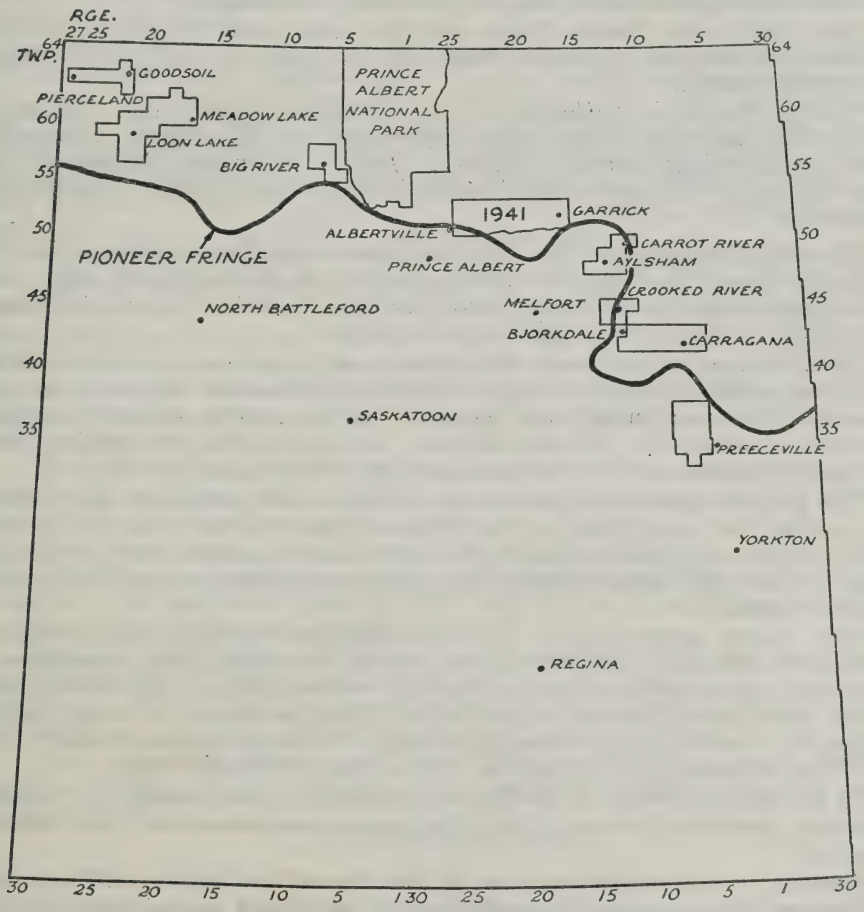
with respect to tax indebtedness and the amount of relief and re-establishment aid was obtained from, or checked through the facilities of the district supervisors of the Northern Areas Branch, Department of Municipal Affairs, Regina.

The schedule provided for suitable checks with respect to all summaries and included a trial balance to ensure a complete enumeration of the current year's income and expenditure.

CHARACTERISTICS OF STUDY AREAS

As indicated previously, eight representative areas were included in the 1942 study. These are equally divided between northwestern and northeastern Saskatchewan on the fringe of settlement.

The areas in northeastern Saskatchewan comprised the Preeceville-Lintlaw, Bjorkdale-Carragana, Crooked River and Aylsham-Carrot River districts. The number of records obtained were 107, 134, 49 and 94, in these respective districts.



Map showing location of Pioneer Farm Business Studies 1941 and 1942 conducted by the Economics Division, Dominion Dep't. of Agriculture in co-operation with the Farm Management Dep't. University of Saskatchewan.

In northwestern Saskatchewan settlers in the Big River, Meadow Lake-Makwa, Loon Lake and Goodsoil-Pierceland districts were interviewed and respectively 64, 97, 64 and 78 usable records were obtained.

Northeastern Area

Preeceville-Lintlaw.—The survey of the Preeceville-Lintlaw district was confined entirely to the area of grey wooded soils comprised mainly of loan textured soils of the Waitville series. About ten townships were represented including townships 34, 35, 36 and 37, in ranges 6, 7 and 8, west of the second meridian. These townships include parts of the rural municipality of Preeceville No. 334, rural municipality of Hazel Dell No. 335 and Local Improvement District No. 365.

The most noteworthy physical features associated with the district are the original cover of heavy poplar growth, the relatively high degree of stoniness and the undulating to rolling topography. Due to these factors the progress of bringing land under cultivation with limited power and equipment has been slow.

The type of farming is characterized by a preponderance of income from livestock and livestock products. Alfalfa production is well adapted to the soils of this district and is becoming of increasing importance.

Sow thistle and Canada thistle are the most persistent weeds and the presence of stones, and of weather conditions favourable to their growth, makes their control difficult.

The population is predominantly of Ukrainian origin while peoples of Scandinavian and Anglo-Saxon origin largely make up the balance. Preeceville is the largest village and the hamlets of Okla, Lintlaw and Endeavour also service the area. The service facilities available are on the whole, suitable and satisfactory.

Bjorkdale-Carragana.—This area lies between the Pasquia Forest Reserve on the north and the Porcupine Forest Reserve on the south and east. The 134 settlers included in the survey were located in townships 42 and 43, ranges 6, 7, 8, 9, 10, 11 and 12, west of the second meridian.

The Northern Areas Branch office located at Chelan was at the time of the survey responsible for administration of municipal affairs in the greater part of this area. The unorganized units concerned in this survey are the Local Improvement Districts Nos. 395, 396 and 425. Several records were obtained near Steen and Bjorkdale in the rural municipality of Bjorkdale No. 426.

The soils in the western part of the district are of extremely light texture being mainly fine sandy loams of the "Sylvania" association. The tree cover is mainly poplar and jackpine and the present cover is apparently a scrubby second growth. The usual topography is gently undulating and most of the land is free of stones.

The eastern portion of the Bjorkdale-Carragana district, from Porcupine Plains to the Somme, has been settled mainly since 1931, and constitutes a considerably more recent settlement than the western portion. The soils of this section are relatively heavy textured soils. They are classed as being mainly Tisdale clay to silty clay loams and mixed "Etomami-Kakwa-Tisdale" clay soils. The topography of this portion of the area is relatively level.

In the western portion of the district emphasis is placed mainly on livestock production, particularly hogs, while in the eastern area commercial grain farming is typical.

Settlers in the western portion of the district are largely of Ukrainian, Russian and German extraction while those in the eastern portion are mainly of Anglo-Saxon origin.

Service facilities are fair in this area although the hamlets are little beyond the pioneer stage. Settlers included in the survey are an average of 5·0 miles from a shipping point and are therefore well served in this respect. There was, however, a shortage of medical facilities and of the other higher types of service facilities.

Crooked River.—The farms visited in the Crooked River area included a number of homesteaders who had part-time employment in the lumber mill located at Crooked River and also in the lumber camps found to the east of this area. Records totalling 49 in number were obtained in townships 44 and 45, ranges 11, 12 and 13, west of the second meridian. These farms are found about six miles east of the line from Peesane to Eldersley.

The soils of this district are grey wooded and degraded black clay loams to clay soils which tend to be poorly drained. The topography is level to undulating. Progress in clearing the heavy bush cover has been slow and this area is still in the pioneer stage.

Many of the farms can be considered to represent "supplementary revenue" or "part-time" farms. Livestock receipts form the highest percentage of total receipts for the commercial farms.

Anglo-Saxons are the predominant national group with Scandinavians and Hungarians in second and third position. Nearly 33 per cent of the settlers interviewed were bachelors as compared with about 18 per cent for all the settlers included in the survey.

Crooked River is the main village and is the most important lumbering centre in northeastern Saskatchewan. A large lumber mill located there turns out about 130,000 feet of lumber per day and in July, 1942, employed about 200 men. Several small portable mills are located throughout the country. Crooked River is a typical frontier town. Practically all the buildings are of lumber construction of very modest size and there is a noticeable lack of paint and neatness. Service facilities are reasonably adequate, in relation to those available in other parts of the northern wooded region.

Aylsham-Carrot River.—Farms located in township 48, ranges 12, 13, 14; township 49, ranges 12 and 13 and township 50, ranges 11 and 12, west of the second meridian were included in the sample survey of this area. In this district large areas of sand and sandy loam soils which were originially under water were made arable by means of drainage projects. Progress in clearing and breaking has been rapid due to the absence of heavy tree cover. This is particularly true in the case of the sandy loam soils between Aylsham and Carrot River.

The soils on the western side of the district are Tisdale clay loams, silty clay loams and heavy clays. North and east of Aylsham, however, the soils are of light texture as previously mentioned.

The farms located on the heavy textured soils are almost fully developed and would be representative of the most advanced development of pioneer districts. The area is an extension of the well known Carrot River Valley area, which includes Melfort and Tisdale.

Receipts from crops and livestock were relatively high and the farms of this district were classed as commercial grain and livestock farms.

Nearly half of the farm operators were of Anglo-Saxon nationality. The remainder included a considerable number of Dutch and French.

The towns of Aylsham and Carrot River are thriving communities and service facilities are good. Carlea and Armley are additional trading centres for the district.

Northwestern Area

Big River.—The Big River district survey covered the area to the north and east of the town of Big River and extends to Bodmin and the Ladder Lake district to the south. The farms included in the survey are located in township 55, ranges 6 and 7 and townships 56 and 57, range 7, west of the third meridian.

The general area is west of the Prince Albert National Park and in the extreme south edge of the Churchill River drainage system.[1]

[1] Rawson, D., et al. The Big River Survey, University of Saskatchewan, August, 1943.

While the town of Big River constitutes an early settlement with respect to its development as a lumbering centre, the district is of recent settlement agriculturally. Practically all of the area has been denuded of the original heavy spruce cover and the present tree cover is mainly of light to heavy bush, mainly aspen poplar (*Populus tremuloides*), with an occasional spruce grove in the lower lying parts. Jackpine is found on the coarse textured soils.

The upland soils are strongly leached and belong to the grey wooded (Podsolic) soil group. Texturally they vary mainly from loams to fine sandy loams and sands. Due to the intensity of leaching, the soils are relatively low in natural fertility. There are some peat soils in the larger depressional areas.

Fishing and lumbering are relatively important in the Big River district. Many settlers obtain part-time employment in these industries and receipts from these sources make up a large proportion of total income of farmers in the district. Lumbering has decreased sharply in recent years as the spruce cover has been depleted. Livestock production has been of increasing importance in recent years.

Anglo-Saxons are the predominant national group while Scandinavians, Germans and French are also present in considerable numbers. Thirty-four per cent of the farm operators included in the survey were single men or widowers.

Big River which is the main shipping centre of the district, is at the end of the Canadian National Railway line from Prince Albert. This line was built in 1910 and was used during the early years to ship out lumber cut by the mill at Big River, which had a capacity of 200,000 feet in a ten-hour day.

Service facilities are relatively good. School, religious and educational facilities are suitable. Medical services are in need of improvement in common with those of other districts. The closest doctor and hospital are at Prince Albert, which is a distance of approximately 90 miles.

Meadow Lake-Makwa.—This area is situated about 100 miles north of North Battleford and is a somewhat isolated block of agricultural land within a generally forested area. Records were obtained in township 58, range 20; township 59, ranges 17, 18, 19, 20; township 60, ranges 17, 18, 19, 20; and township 61, range 18, west of the third meridian. Municipal affairs are administered by district supervisors of the Northern Areas Branch located at Meadow Lake.

The closest settlement to the south is near Glaslyn, approximately 56 miles distant. The Provincial Meadow Lake Forest Reserve lies between these two points.

The soils in the immediate vicinity of Meadow Lake are mainly degraded black to black clay loams. These are relatively productive soils and farmers in this area have comparatively large acreages of improved land. However, the area of these soils is limited to about five townships. The soils in the western section of this area, near Makwa, are degraded black to grey wooded loams and light loams and vary considerably in intensity of leaching.

Meadow Lake is at the end of the railway line from Prince Albert through Shellbrook and the new town was started in 1928. It is a thriving centre, with some excellent hotels, stores and dwellings. There are five elevators with two of them having three temporary annexes each.

The western portion of the district includes the two hamlets of North and South Makwa, neither of which is located on a railroad. Each contains a grain elevator and grain is bought and stored, and then trucked to the railroad at Meadow Lake or to St. Walburg.

Practically all of the uncultivated area is covered by medium to heavy tree cover. The clay loam soils around Meadow Lake are practically free of stones, but there are numerous stones on the light textured soils, particularly on those north and east of Makwa. There also are numerous tracts of poorly drained swampy land in the north and east portions of this area.

On the heavier textured soils grain production is the major source of income but on the poorer grades of land livestock and livestock products, particularly hogs, account for a large proportion of the total receipts. Progress in clearing has been aided considerably by numerous fires.

Those of German nationality make up the largest proportion of the settlers, followed by those of Anglo-Saxon origin. A little over half, 51·5 per cent, of the settlers included in the sample were previously located on farms in southern Saskatchewan. This situation is typical of all districts in northwest Saskatchewan in contrast to the case in northeastern Saskatchewan, where only 24 per cent of settlers came from the south part of the province.

Loon Lake.—The settlers visited in this area are found in townships 57 and 58, ranges 21 and 22, and also in the "Saskatoon" settlement in townships 58, ranges 23 and 24, and the "Moose Jaw" settlement in township 59, ranges 21 and 22, west of the third meridian. The "Saskatoon" settlement is about 18 miles west of the hamlet of Loon Lake and the "Moose Jaw" settlement is immediately north of Loon Lake. Some difficulty was encountered in reaching settlers in these settlements due to the poor development of roads.

The soils in the older settled Loon Lake district are grey wooded to degraded black loams. These are relatively good soils and stones are not frequent. The tree cover is mainly aspen poplar and is medium to heavy in density. Some settlers have been in this area since 1914. They "squatted" for a number of years and used the free range provided by fairly frequent meadows. These settlers carried considerable numbers of cattle. Livestock numbers are relatively large at the present time and practically all the grains produced are fed to hogs and cattle. This is due primarily to the difficulties associated with the transportation of grain.

Farms in the "Saskatoon" and "Moose Jaw" settlements are also located on grey wooded soils. The textures of these soils are fine sandy loams to light loams. Stones are very frequent and the difficulties in bringing this land under cultivation are very apparent in the slow progress of farm development. The families settled here were established on homesteads through settlement projects arranged by the two cities to cope with the relief problem during the early drought years.

As yet there is no rail connection for Loon Lake but the grade of the projected St. Walburg-Bonnyville line which will pass through Loon Lake, has been built. Fair standard grade dirt highways connect Loon Lake with St. Walburg and with Meadow Lake. As a great deal of the hauling of products is done by heavy trucks a severe strain is placed on these roads. Farmers are an average of 33 miles from the above nearest shipping point.

A little over one-third of the farmers in the sample were of German nationality, the remainder being nearly evenly divided between Anglo-Saxons and Ukrainians. Most of the settlers came to the district from southern Saskatchewan although the "Sudeten" settlers and a considerable proportion of the other German settlers came directly from Continental Europe.

The hamlet of Loon Lake, which is built within the edge of an Indian Reserve close to Makwa Lake, is the nucleus of the community. Service facilities are relatively good, and medical facilities are superior to those in the other districts of the survey. Educational facilities are provided by the usual country school, with some high school training being available at Loon Lake.

In common with the Meadow Lake district there are a number of small country stores scattered throughout the district. These stores serve farms in their immediate vicinity and help to minimize travel to the principal service centres.

Goodsoil-Pierceland.—This district is in the most northerly and the most recently settled agricultural area of Saskatchewan. The area included in the sample survey comprised townships 61 and 62, ranges 22 to 26 and township 63,

range 22, west of the third meridian. This area was settled largely from 1929 to 1934, although some settlers were located previous to that time. Considerable amounts of relief assistance and re-establishment aid have been given to settlers in this area.

The soils near Goodsoil and south to the Beaver River are mainly degraded black loam, while those west of this area and near Pierceland are grey wooded fine sandy loams and loams. Stones are a serious handicap to cultivation in certain local areas. The tree cover varies considerably but is mainly light bush and light scrub. Around Pierceland the tree cover is somewhat heavier.

As neither of the two hamlets of Goodsoil and Pierceland is serviced by a railroad all hauling of products is done by truck. Trucks from the east of the district travel to railroads at Meadow Lake or St. Walburg, while for the area near Pierceland the trucks travel to market at Bonnyville via the railroad grade of the projected St. Walburg-Bonnyville line. Settlers in the survey averaged 60·4 miles from a shipping point.

Service facilities in the two hamlets are confined chiefly to the supply of staple goods. Telephone communications are absent and there are no medical or hospital facilities within the district.

An interesting venture in this district at the time of the survey was the co-operative cannery at Pierceland which sells products under the trade mark of "Nor-Gro". Vegetables and fruit are the main products canned although some meat and fish are also processed.

Settlers in this area are predominantly of German origin while there are a number of Russians, Ukrainians and Polish. Only about 13 per cent of the 78 settlers interviewed were of Anglo-Saxon origin.

SOILS AND CLIMATE[1]

The Soils

The soils of the representative pioneer areas are of two main zonal types, the grey wooded, and the degraded black (transition) soils. The grey wooded soils are those associated with the grey wooded soil-climatic zone, while the degraded black soils constitute a zonal type identified with areas, transitional between the black parkland soil-climatic zone and the grey wooded soil-climatic zone. The dark coloured soils of Meadow Lake have been classed as black and degraded black soils by the Soils Department of the University of Saskatchewan and are considered as black parkland soils in this report.

Grey Wooded soils—These are soils which develop under tree cover, particularly under tree cover including a partial or complete stand of coniferous forest. The tree cover and the high moisture efficiency lead to the development of leached greyish-coloured "podsolized" soils that are low in organic matter.

It is estimated by the Soils Department, University of Saskatchewan, that these soils cover about 31 million acres and together with associated peat deposits and rock outcrops, occupy about 64 per cent of the total area of the province. To date, only the southern fringe of the grey wooded soil zone has been occupied for agricultural settlement. The remaining area of grey wooded soils makes up the bulk of the unsettled lands of the province.

The vegetative cover is composed largely of mixed woods including aspen poplar (*Populus tremuloides*), black poplar (*Populus tacamahacca*), white spruce (*Picea glauca*), black spruce (*Picea mariana*), birch (*Betula papyrifera*), jackpine (*Pinus Banksiana*), and tamarack (*Larix laricina*). The low depressional areas are characterized by marsh and bog vegetations including sedges, rushes, sphagnum, tamarack and black spruce.

[1] Information contained in this section is based on reports of the Soils Department, University of Saskatchewan, mainly "Report on the Revised Map of Saskatchewan Soil Zones" for subcommittee of Saskatchewan Cereal Variety Committee, January, 1943.

The typical soils in this region have a grey leached ash-like layer or horizon near the surface, immediately below a thin dark leaf mould. The cultivated surface layer usually varies from dark to light grey in colour. When dry the soil is usually much lighter in colour than when moist. The lime layer in these soils is usually encountered between two and four feet below the surface.

The organic-matter content of grey wooded soils, which is indicative of the fertility of the soils, is lower than for other soil zones of the province. The average nitrogen content is about 0·15 per cent compared with 0·48 per cent for the black soils, 0·30 per cent for the dark brown soils and 0·19 per cent for the brown soils. The figure for the grey wooded soils is not entirely representative for the zone, and includes some heavy-textured "podsol" soils. For the predominant loam to light loam and sandy types, the nitrogen content will not average 0·10 per cent. Several sandy "podsol" soils have given values of about 0·05 per cent—the lowest nitrogen content so far obtained for any Saskatchewan surface soils.

The textural types of the grey wooded soils include chiefly medium textured soils formed from glacial till and lighter textured soils from alluvial and outwash deposits. Throughout the grey wooded zones there are a few smaller areas of heavier textured soils of good topography, formed from lacustrine deposits.

A total of 440 records, or 64·1 per cent of the records obtained in the study, were from settlers located on grey wooded soils. Twenty-eight per cent of these records were from settlers on sand to fine sandy loams, 64 per cent for settlers on light loams to loams and only 8 per cent for settlers on clay soils in the grey wooded soil zone.

The records for the sandy to fine sandy loam group were obtained in the western section of the Bjorkdale-Carragana area, in the area near Carrot River and in the southern part of the Big River district. The soils of the Bjorkdale-Carragana and the Carrot River area are of the "Sylvania" association, which is considered one of the poorest classes of agricultural soil of the province. The sandy soils at Big River are of the "Bodmin" association, and are also of low agricultural value.

The records of settlers located on grey wooded light loam to loam soils were obtained in the Preeceville-Lintlaw, Big River, Meadow Lake-Makwa, Loon Lake and Goodsoil-Pierceland districts. The soils are of the "Waitville" association, derived from morainic deposits, and are the most typical of soils found in the grey wooded soil zone. The topography in most of the area is level to undulating although there are some areas of gently rolling to rolling topography. Stones are a serious handicap in some areas, particularly in the Preeceville-Lintlaw area and parts of the Makwa and Loon Lake areas.

The records of farmers located on grey wooded clay loam and clay soils are found at Crooked River and at Aylsham-Carrot River. Those obtained at Crooked River are of the "Waitville" and "Arborfield" association and those at Aylsham-Carrot River are of the "Arborfield" association.

Degraded black soils.—The degraded black soils are transitional between the black parkland and the grey wooded forest soils. They do not represent any well defined zone of soils, occurring as a broad unbroken belt. Rather they occupy irregular areas at the fringes of the black and grey wooded zones, and isolated areas within the black and grey wooded soil zones.

These soils represent former grassland areas which have undergone woodland invasion. The original black soil characteristics have been partially modified or replaced by features common to the grey wooded soils. Depending upon the extent of this so-called "degradation" process, the degraded black soils range from types hardly distinguishable from the true black soils to types very similar to the true grey wooded soils. The range in nitrogen content of these soils is from 0·20 to 0.35 per cent, indicating a level of fertility intermediate between

the black and grey soils. Of the total number of records obtained in the survey 31.7 per cent were from settlers on the degraded black soils. Eight per cent of the settlers in this transitional area were located on sand to fine sandy loams; 35·0 per cent on light loam to loams and 57·0 per cent on clay loams to clays. As the development of podsolic soils involves the downward movement of various chemical substances by percolating water, it is evident that this process can go on more rapidly in light textured soils. Thus most of the records for the degraded black soil group would be more nearly comparable to black soils than to grey soils with respect to the level of fertility.

The records for the degraded black sandy to fine sandy loam soils were obtained in the Aylsham-Carrot River area. These soils are of the Shellbrook series. The records for degraded black light loams to loams were obtained in the Bjorkdale-Carragana, Meadow Lake-Makwa, Loon Lake and Goodsoil-Pierceland districts. In the Bjorkdale-Carragana area they are of the Kakwa association while these soils in northwestern Saskatchewan have not been designated as to soil association as yet. The degraded black clay loam to clay soils were represented in the Bjorkdale-Carragana, Crooked River and Aylsham-Carrot River districts. They are very productive soils and are mainly of the "Tisdale" association, while some are mixtures of the "Tisdale" and "Arborfield" associations. The "Tisdale" soils are high in organic matter, and are usually of desirable topography and free from stones. In the mixed "Tisdale" and "Arborfield" soils, drainage is somewhat slow due to the heavy texture and also the solenetzic features of the soil. Stones are usually absent. Progress on these soils has been satisfactory.

Black soils—As indicated previously, the dark coloured soils of the Meadow Lake district have been classed as black soils. These soils are mainly of clay loam texture, and, as the "degradation" process is slower in heavier textured soils, they can be considered as superior degraded black soils closely resembling the black soils.

These soils show the effect of the significant increase in moisture efficiency of the wooded region in comparison with the brown and dark brown soils of the province. An important character of these soils is the deep humus-bearing surface horizon, indicating a high degree of natural fertility.

Only 4·2 per cent of the records obtained were from settlers located on black soils and these were all in close proximity to Meadow Lake. The proportion of records for the black soils probably approaches the proportion of black soils relative to other types in newer pioneer areas of Saskatchewan.

Vegetation

The native vegetation of an area presents a characteristic appearance and is largely an expression of the climate, which is the controlling factor in determining the type of vegetative cover. The region of the pioneer fringe of the province belongs to the mixed-wood section of the Boreal Forest region of Canada.[1] Though this region is primarily coniferous, there is a general admixture of certain broad-leaved trees. As the name implies, the characteristic association is a mixture, in varying proportions, of aspen, balm of gilead, white spruce, white birch and balsam fir. Large areas of well-developed aspen and balm of gilead associations occur generally on the heavier-textured soils. Jackpine associations tend to predominate on sandy areas and a mixture of black spruce and jackpine is characteristic of the plateau-like tops of the hills. The lower positions and the upper water-catchment areas develop black spruce and tamarack sphagnum bogs.

[1] Halliday, W. E. D., A Forest Classification for Canada. Bulletin 89. Forest Service, Department of Mines and Resources, 1937.

Three main forest types can be recognized in this area, normal poplar, open poplar and poplar-spruce. The normal poplar type is characterized by fairly dense stands of aspen poplar (*Populus tremuloides*). The open poplar is predominately aspen poplar with some black poplar, but the stand is more open and the trees are less branched and shorter in relation to diameter than in the normal poplar type. Both of these types have been disturbed by frequent fires. The shrub layer is well developed in the normal poplar but is dwarfed in the open poplar.

The poplar-spruce type is found mostly in lower areas which afford protection from fires. The amount of spruce varies considerably and the areas are not clearly defined.

The vegetation study made in connection with a co-ordinated survey of the Big River district indicated a considerable measure of agreement in soil and plant types.[1] The normal poplar, which is the most extensive area, and the poplar spruce association are found on loams, silt loams and clay loams. The open poplar is confined to the coarse textured soils and to loam soils of a stony phase.

There are also many depressional areas which are the beds of dried up lakes and which are occupied by meadows. These are covered by plants of the sedge grass association while the more recent beds are often occupied by weeds. This type of vegetation is associated with peat soils.

The cover of the present unimproved land of each quarter-section of land included in the Northern Pioneer Areas survey was classed according to type and density of cover. Six classes were used, as follows: light scrub, medium scrub, heavy scrub and light bush, medium bush and heavy bush.[2] Table 1 indicates the distribution of the unimproved area according to this cover classification.

Medium bush was the predominant cover in all of the survey. The Aylsham-Carrot River district showed the highest proportion of scrub cover, while Big River showed the highest proportion of bush cover. Crooked River indicated the higher proportion of heavier tree cover in the northeastern area with 49·4 per cent of the area being covered by medium or heavy bush. In the northwest area the heaviest tree stands were in the Big River and Loon Lake districts where the respective areas were medium and heavy bush. The high proportion of 'other' classes of cover at Crooked River is accounted for mainly by the presence of considerable areas of swamps.

Arability of Land

The settlers included in the surveys were asked to estimate the amounts of land on their farm which could be put under cultivation. The advisability of breaking additional land from the standpoint of the relation of the costs of clearing and breaking to the value of the land, was not taken into consideration in the estimates. Table 2, gives the distribution of quarter-sections according to the area of land which was considered arable.

The most striking feature is the very high arability of all areas with the exception of the Preeceville-Lintlaw district. At both Aylsham-Carrot River and Meadow Lake all the quarter-sections were considered to have at least 70 acres of arable land. At Aylsham-Carrot River 90·7 per cent of all quarter-sections were estimated to have over 150 acres of arable land and at Meadow Lake the corresponding proportion was 79·0 per cent.

---

[1] D. S. Rawson, et al. The Big River Survey. University of Saskatchewan, August, 1943.

[2] Scrub cover is designated as that having shrubs and trees of a size which could be cleared without the stumps of trees having to be pulled out and removed before breaking. Bush cover is that which requires the stumps to be pulled out and removed before breaking.

TABLE 1.—PROPORTION OF VARIOUS TYPES OF COVER BASED ON PRESENT UNIMPROVED LAND, NORTHERN PIONEER AREAS STUDY, SASKATCHEWAN, 1942

Area	Predominant type of Cover								
	Light scrub	Medium scrub	Heavy scrub	Light bush	Medium bush	Heavy bush	Cleared	Other (1)	All Types
	%	%	%	%	%	%	%	%	%
North-East—									
Preeceville-Lintlaw....	10·1	4·4	5·6	15·9	36·5	4·6	4·3	18·6	100·0
Bjorkdale-Carragana..	9·1	7·4	3·0	16·4	31·2	12·7	3·9	16·3	100·0
Crooked River.....	8·4	3·7	5·9	7·8	38·1	11·3	2·6	22·2	100·0
Aylsham-Carrot River.....	11·2	16·6	17·9	3·5	21·5	9·5	4·5	15·3	100·0
North-West—									
Big River.....	5·6	0·4	1·6	20·4	40·7	17·3	1·7	12·3	100·0
Meadow Lake-Makwa	4·8	6·6	13·8	24·0	25·1	8·3	1·6	15·8	100·0
Loon Lake.....	8·4	7·7	4·2	14·6	23·3	24·6	2·6	14·6	100·0
Goodsoil-Pierceland..	2·4	1·8	10·8	21·3	41·1	3·5	4·7	14·4	100·0

(1) Includes wild grass or meadow land and peat, muskeg or burned-over land.

TABLE 2.—DISTRIBUTION OF QUARTER-SECTIONS ACCORDING TO THE AREA OF ARABLE LAND PER QUARTER SECTION, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

Acres Arable	Northeast							
	Preeceville-Lintlaw		Bjorkdale-Carragana		Crooked River		Aylsham-Carrot River	
	Quarter-sections	%	Quarter-sections	%	Quarter-sections	%	Quarter-sections	%
Under 30 acres.....	4	2·6	1	0·4	.....	.....	.....	.....
30–49 acres.....	2	1·3	2	0·8	1	1·4	.....	.....
50–69 acres.....	8	5·1	6	2·5	3	4·2	.....	.....
70–89 acres.....	13	8·3	11	4·7	2	.....	.....	.....
90–109 acres.....	15	9·6	8	3·4	5	6·9	3	1·6
110–129 acres.....	28	18·0	26	11·0	10	13·9	6	3·3
130–149 acres.....	41	26·3	53	22·5	11	15·3	8	4·4
150 acres plus.....	45	28·8	129	54·7	40	55·5	166	90·7
Total.....	156	100·0	236	100·0	72	100·0	183	100·0

Acres Arable	Northwest							
	Big River		Meadow Lake		Loon Lake		Goodsoil-Pierceland	
	Quarter-sections	%	Quarter-sections	%	Quarter-sections	%	Quarter-sections	%
Under 30 acres.....	3	2·6	1	0·5	1	0·9	2	1·5
39–49 acres.....	1	0·9	.....	.....	.....	.....	1	0·8
50–69 acres.....	6	5·3	.....	.....	1	0·9	2	1·5
70–89 acres.....	1	0·9	5	2·8	8	6·9	5	3·8
90–109 acres.....	8	7·0	4	2·2	5	4·3	4	3·0
110–129 acres.....	8	7·0	11	6·1	14	12·1	19	14·3
130–149 acres.....	15	13·2	17	9·4	21	18·1	26	19·5
150 acres plus.....	72	63·2	143	79·0	66	56·8	74	55·6
Total.....	114	100·0	181	100·0	116	100·0	133	100·0

The proportions of quarter-sections having over 130 acres of arable land were 95·1 and 88·4 per cent at Aylsham-Carrot River and Meadow Lake, respectively. At Preeceville-Lintlaw the proportion was only 55·1 per cent. The other areas ranged from 77.2 per cent at Bjorkdale-Carragana to 70·8 per cent at Crooked River.

A grouping according to the zonal type of soil, shown in Table 3, indicated a higher arability of black and degraded black soils than for grey wooded soils. Only 71·6 per cent of the quarter-sections on grey wooded soils were estimated to have over 130 acres of arable land compared wtih 87·7 and 87·5 per cent, respectively for degraded black and black soils.

TABLE 3.—RELATION OF SOIL TYPE TO ACRES OF ARABLE LAND PER QUARTER SECTION, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

Acres Arable	All Grey Wooded Soils		All Degraded Black Soils		All Black Soils		Total all Soils in Survey	
	No.	%	No.	%	No.	%	No.	%
Under 30 acres	10	1·4	2	0·5	.....	.....	12	1·0
30–49 acres	7	1·0	.....	.....	.....	.....	7	0·6
50–69 acres	25	3·4	1	0·2	.....	.....	26	2·2
70–89 acres	32	4·4	11	2·6	2	4·2	45	3·8
90–109 acres	41	5·6	11	2·7	.....	.....	52	4·4
110–129 acres	92	12·6	26	6·3	4	8·3	122	10·2
130–149 acres	142	19·5	46	11·1	4	8·3	192	16·1
150 acres plus	380	52·1	317	76·6	38	79·2	735	61·7
Total	729	100·0	414	100·0	48	100·0	1,191	100·0

Climate

The climate of the northern pioneer region is characterized by a longer and more severe winter, cooler summer, an only slightly higher annual precipitation and a considerably shorter frost-free period than for the prairie and park area of the province.

Figure 1, Page 20, shows the mean summer temperature (Average for June, July and August) for various parts of the province. The northern pioneer region has a mean summer temperature ranging from 57° to 59° in the northwest and approximately 59° in the northeast. These temperatures are considerably lower than for the prairie areas of Saskatchewan.

The duration of the severest period of winter in northern Saskatchewan is considerably longer than for southern Saskatchewan. The extreme range for the province is from 20 days in the extreme southwest to 120 days in the north and east. Figure 2, Page 20, shows the comparative lengths of the severest period of winter for different areas of Saskatchewan.

The frost-free period of an area is of particular significance as it limits the kinds and varieties of crops which can be grown. Figure 3 shows the number of days between the last killing frost in the spring and the first killing frost in the fall for different parts of Saskatchewan. For the province, the frost-free period ranges from 125 days in the south to 75 days in the northwest. For the northern pioneer region it ranges from 75 to 110 days. In relation to the length of the frost-free period there is a distinct advantage for areas in northeastern Saskatchewan compared with areas in the northwestern part of the province. While additional climatic data are required to substantiate this fact, it is an important consideration to be kept in mind in planning new land settlements in northern areas.

Figure 1.—MEAN TEMPERATURE IN SUMMER (Fahr.) JUNE, JULY AND AUGUST[1]

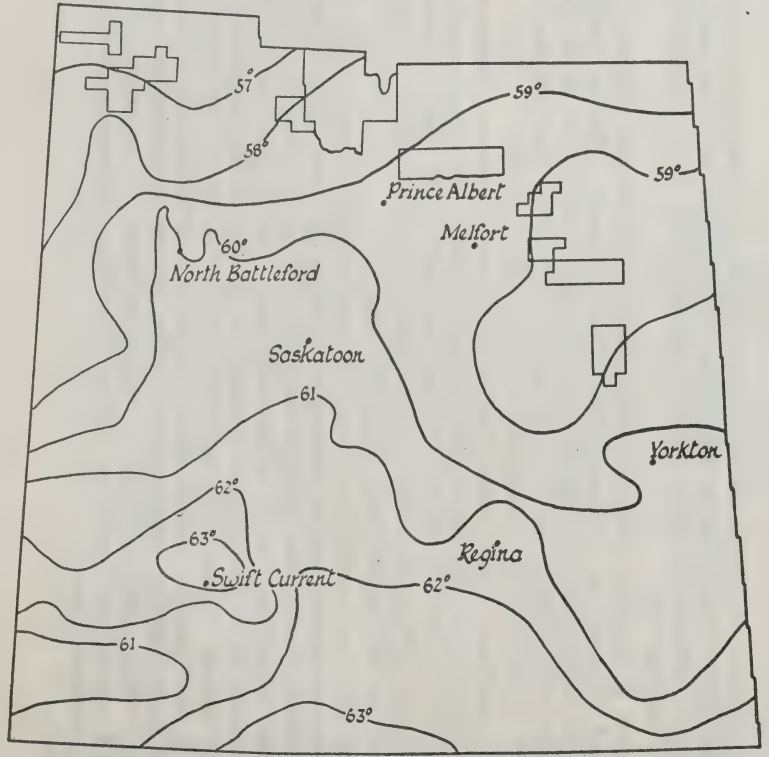
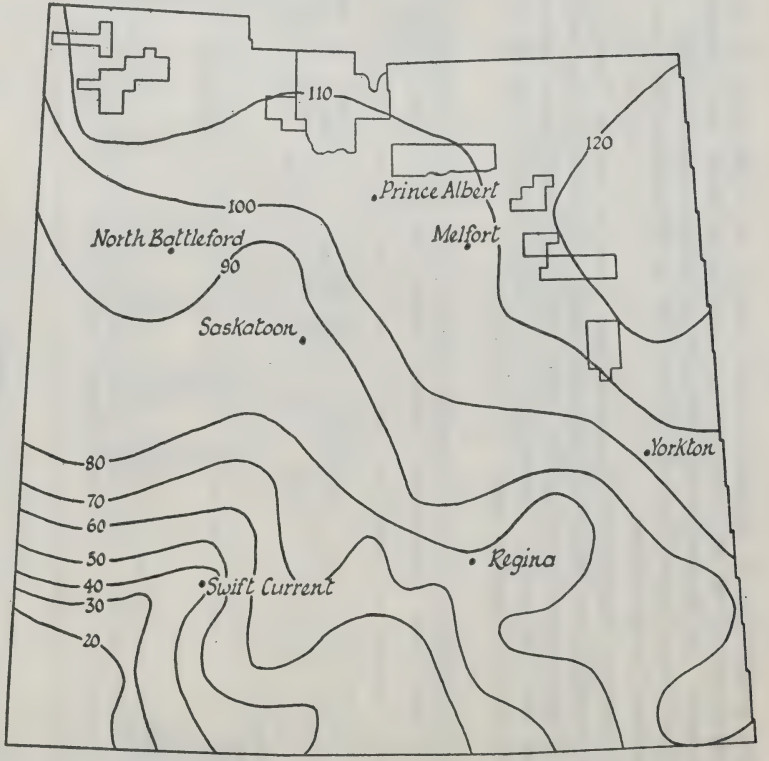


Figure 2.—COMPARATIVE LENGTH OF SEVEREST PERIOD OF WINTER IN DAYS[1]

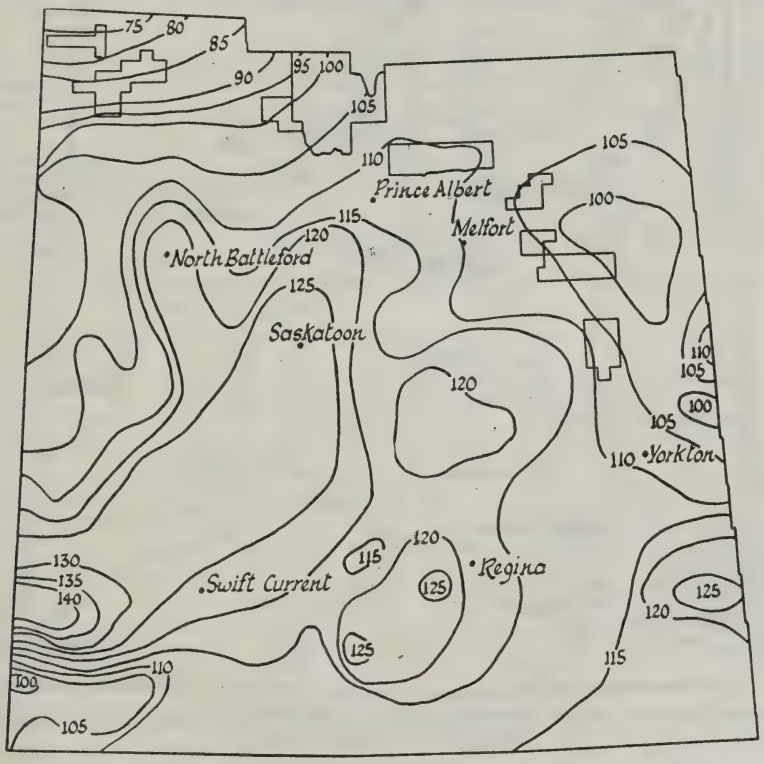


[1] Agriculture, Climate and Population of the Prairie Provinces of Canada. Dominion Bureau of Statistics, 1931.

"The average temperature of the winter months has increased steadily during the past forty years. This tendency towards higher temperatures has now spread to the fall months with the result that the frost-free period has lengthened. Data from a few places with long weather records indicate that the growing season has lengthened from five to twelve days during the past twenty years. This change should not be considered a permanent one."[1]

Precipitation data for a satisfactory period are not available for areas included in the northern pioneer areas study. Available records, however, indicate that the areas in the northeastern part of Saskatchewan receive from 14 to 17 inches of precipitation annually. The Big River district receives about 14 inches of precipitation and the Meadow Lake-Makwa, Loon Lake and Goodsoil-Pierceland areas approximately 13 inches.

Figure 3.—AVERAGE LENGTH OF PERIOD IN DAYS BETWEEN LAST KILLING FROST OF SPRING (29° Fahr.) AND FIRST KILLING FROST OF FALL.



Agriculture, Climate and Population of the Prairie Provinces of Canada. Dominion Bureau of Statistics, 1931.

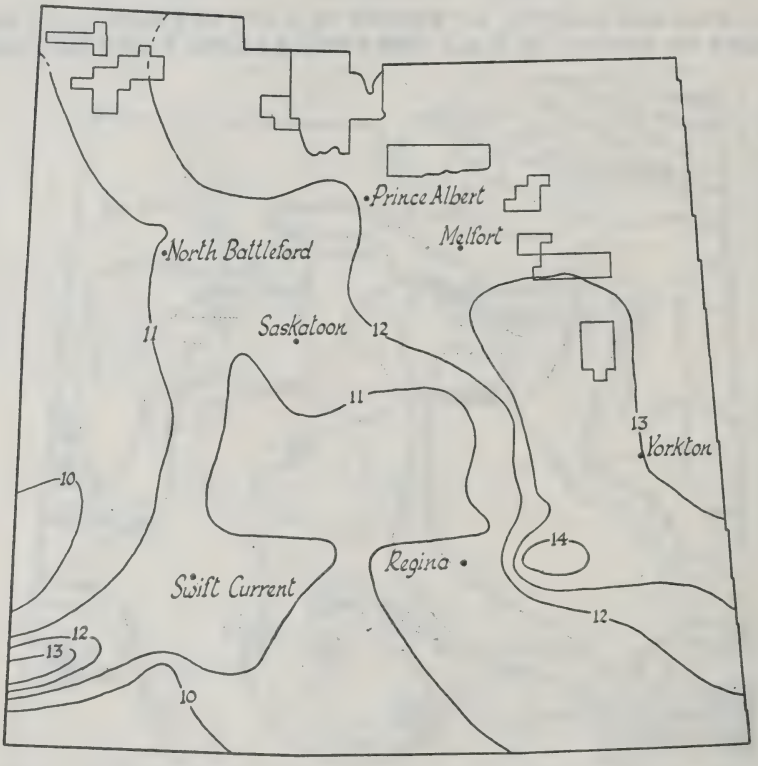
The average precipitation for the crop season (April to October) for Saskatchewan is shown in Figure 4. It has been found that the precipitation during this period amounts to about four-fifths of the total annual precipitation. The balance of the precipitation is largely in the form of snow, and in most years, the amount of snowfall has little effect on the yield of grain crops.

The variability of rainfall is considerably less in the northern pioneer region of Saskatchewan than in the prairie region. However, relatively long periods of drought conditions do occur in some parts of the north, particularly in the northwestern areas.

[1] Report on Climate in Saskatchewan. Guide to Farm Practice in Saskatchewan, 1942. Contributed by Department of Physics, University of Saskatchewan.

A factor of greater importance than variability in relation to precipitation is that of moisture efficiency. This refers to the relative degree of availability of the precipitation to crops in any year and takes into account the losses due to evaporation. The combined effects of annual precipitation, annual temperature and seasonal evaporation (May to September) from a free water surface are indicated by the P/TE ratios. Higher numerical values of this soil moisture index (1) represent higher moisture efficiencies. Relatively high soil moisture indices are probable at points in the northern parts of the province. There is a gradual increase in moisture efficiency as one progresses from the southwest part of the province to the north and east.

Figure 4.—AVERAGE PRECIPITATION (INCHES) APRIL TO OCTOBER, INCLUSIVE



Reference, Rainfall records for Saskatchewan, Agricultural Extension Bulletin No. 18, University of Saskatchewan.

Another factor of significance in connection with the climate of the northern pioneer region is the number of hours of sunlight during the growing season compared with the southern part of the province. Complete and accurate information is not available but some results indicate that about one half hour more of sunlight is received in the north on June 1 as compared with the south.

Sources, Supply and Quality of Water

The water supply of an area is closely related to the climatic conditions and geological development. The source and supply of water, in turn, is a very important factor in regard to livestock production and therefore in determining the type of farming of an area. The sources of water available to settlers in the northern pioneer areas are shown in table 4.

[1] Relating the Moisture Efficiency to Saskatchewan Soil Zones, W. Millsap, unpublished data, Saskatchewan Soil Survey, 1939.

While there are a number of creeks, rivers, and lakes in each of the areas of the study, the use of ground supplies of water by means of wells was the most important source of water. The fact that considerable numbers of settlers

TABLE 4.—DISTRIBUTION OF SOURCE OF WATER SUPPLY BY AREAS, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Northeast Area									
	Preeceville-Lintlaw		Bjorkdale-Carragana		Crooked River		Aylsham-Carrot River		Total Northeast	
	No.	%	No.	%	No.	%	No.	%	No.	%
Number of Records	107	.....	134	.....	49	.....	94	.....	384	.....
Haul water	11	10·3	7	5·2	2	4·1	11	11·7	31	8·1
Well only	68	63·6	70	52·2	39	79·6	62	66·0	239	62·2
Well and creek	4	3·7	17	12·7	1	2·0	1	1·1	23	6·0
Well and lake	3	2·8	4	3·0	3	6·1	.....	.....	10	2·6
Creek or river only	1	0·9	14	10·5	.....	.....	2	2·1	17	4·4
Lake only	.....	.....	1	0·7	.....	.....	3	3·2	4	1·1
Dam or dugout only	6	5·6	16	11·9	1	2·1	9	9·6	32	8·3
Well and dam or dugout	14	13·1	3	2·2	3	6·1	3	3·2	23	6·0
Dam or dugout and creek or lake	.....	.....	1	0·8	.....	.....	1	1·0	2	0·5
No information	.....	.....	1	0·8	.....	.....	2	2·1	3	0·8
Total	107	100·0	134	100·0	49	100·0	94	100·0	384	100·0

—	Northwest Area										Total All Survey	
	Big River		Meadow Lake		Loon Lake		Goodsoil-Pierceland		Total Northwest			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Number of Records	64	.....	97	.....	64	.....	78	.....	303	.....	687	.....
Haul water	6	9·4	1	1·0	.....	.....	2	2·6	9	3·0	40	5·8
Well only	38	59·4	89	91·8	57	89·1	73	93·6	257	84·8	496	72·2
Well and creek	6	9·4	5	5·2	5	7·8	1	1·3	17	5·6	40	5·8
Well and lake	10	15·6	.....	.....	.....	.....	2	2·5	12	4·0	22	3·2
Creek or river only	1	1·6	2	2·0	1	1·6	.....	.....	4	1·3	21	3·1
Lake only	2	3·1	.....	.....	.....	.....	.....	.....	2	0·7	6	0·9
Dam or dugout only	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32	4·6
Well and dam or dugout	.....	.....	.....	.....	1	1·5	.....	.....	1	0·3	24	3·5
Dam or dugout and creek or lake	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	0·3
No information	1	1·5	.....	.....	.....	.....	.....	.....	1	0·3	4	0·6
Total	64	100·0	97	100·0	64	100·0	78	100·0	303	100·0	687	100·0

at Preeceville-Lintlaw, Aylsham-Carrot River and Big River hauled water reveals a factor related to livestock production in these districts. Dams and dugouts were found to a considerable extent in most districts of the north east but only to a limited extent in the north west areas.

The supply of water was definitely poor at Preeceville-Lintlaw, Bjorkdale-Carragana and Crooked River and there was a relatively poor quality of water at Preeceville-Lintlaw and Crooked River. The supply was fair at Aylsham-Carrot River and good in the northwestern area. Table 5 summarizes information on the adequacy of supply and the quality of water by areas.

RAILWAYS AND ROAD COMMUNICATIONS

All areas of the northeastern part of the province included in this study were relatively well serviced by railways. The Kelvington extension of the Sturgis line of the Canadian National Railways was completed in 1921. This railway services the Preeceville-Lintlaw area. The Bjorkdale-Carragana area is serviced by a branch line of the Canadian National Railways from Crooked River to Reserve which joins the Hudson Bay Junction line. This branch line was completed in 1929. The Melfort, Hudson Bay Junction line was completed in 1904 and services the Crooked River Area. The Melfort to Carrot River line was completed in 1930, and the Tisdale-Nipawin line was completed in 1924. These two railway lines service the Aylsham-Carrot River district. The Crooked River-Arborfield extension which was built in 1929 served the south-eastern part of this area. Figure 5 shows the dates of completion of railway lines in the northern areas of the province.

TABLE 5.—DISTRIBUTION OF FARMS ACCORDING TO ADEQUACY AND QUALITY OF WATER SUPPLY BY AREAS, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Northeast Area									
	Preeceville-Lintlaw		Bjorkdale-Carragana		Crooked River		Aylsham-Carrot River		Total Northeast	
	No.	%	No.	%	No.	%	No.	%	No.	%
Poor supply, poor quality	9	10·0	9	9·7	7	15·2	2	2·2	27	8·5
Poor supply, fair quality	21	23·3	14	15·0	12	26·1	9	10·1	56	17·6
Poor supply, good quality	15	16·7	26	27·9	4	8·7	6	6·7	51	16·0
Fair supply, poor quality	4	4·4	2	2·2	5	10·9	5	5·7	16	5·0
Fair supply, fair quality	16	17·8	2	2·2	9	19·5	8	9·0	35	11·0
Fair supply, good quality	12	13·3	24	25·8	5	10·9	34	38·2	75	23·6
Good supply, poor quality	....	.....	1	1·1	1	2·2	4	4·5	6	1·9
Good supply, fair quality	7	7·8	....	.....	1	2·2	5	5·6	13	4·1
Good supply, good quality	6	6·7	15	16·1	2	4·3	16	18·0	39	12·3
Total with information	90	100·0	93	100·0	46	100·0	89	100·0	318	100·0
Total no information	17	.....	41	.....	3	.....	5	.....	66	.....
TOTAL	107	.....	134	.....	49	.....	94	.....	384	.....

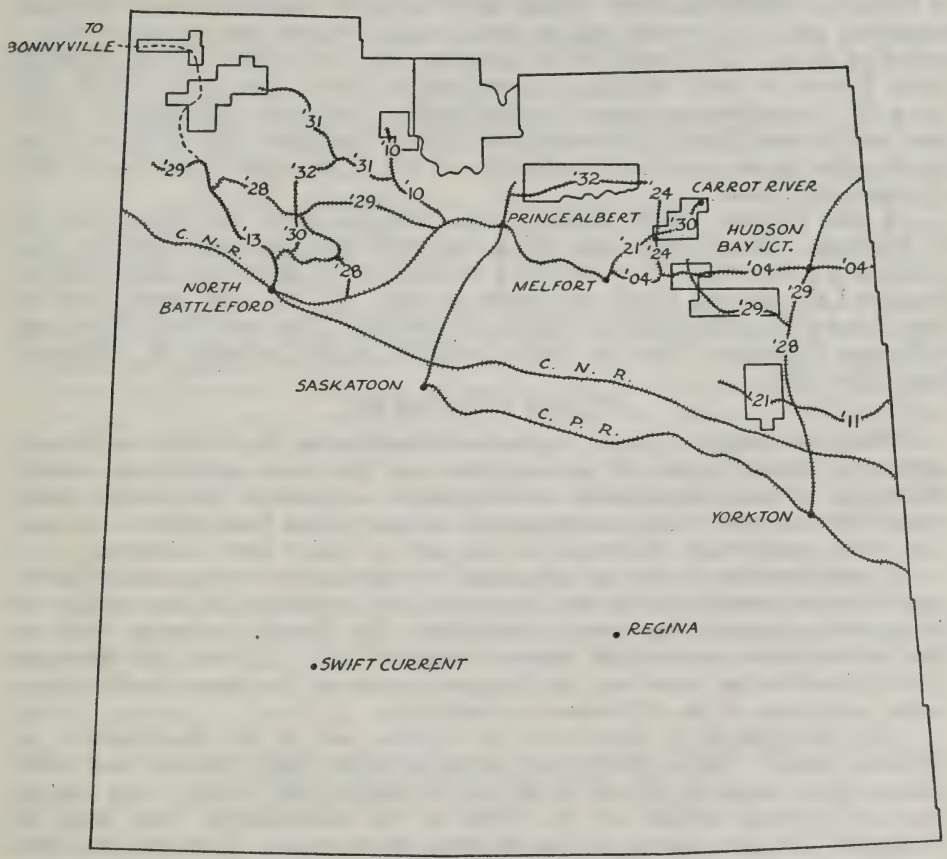
—	Northwest Area										Total All Survey	
	Big River		Meadow Lake		Loon Lake		Goodsoil-Pierceland		Total Northwest			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor supply, poor quality	5	7·8	1	1·1	2	3·2	4	5·3	12	4·0	39	6·3
Poor supply, fair quality	3	4·7	....	.....	2	3·2	4	5·3	9	3·0	65	10·6
Poor supply, good quality	10	15·6	12	12·7	13	20·6	10	13·1	45	15·2	96	15·6
Fair supply, poor quality	....	.....	7	7·4	1	1·6	7	9·2	15	5·1	31	5·0
Fair supply, fair quality	5	7·8	4	4·3	1	1·6	6	7·9	16	5·4	51	8·3
Fair supply, good quality	17	26·6	44	46·8	24	38·1	24	31·6	109	36·7	184	29·9
Good supply, poor quality	1	1·6	4	4·3	....	.....	3	3·9	8	2·7	14	2·3
Good supply, fair quality	9	14·0	2	2·1	1	1·6	....	.....	12	4·0	25	4·1
Good supply, good quality	14	21·9	20	21·3	19	30·1	18	23·7	71	23·9	110	17·9
Total with information	64	100·0	94	100·0	63	100·0	76	100·0	297	100·0	615	100·0
Total no information	....	.....	3	.....	1	.....	2	.....	6	.....	72	.....
TOTAL	64	.....	97	.....	64	.....	78	.....	303	.....	687	.....

The Big River area is serviced by the Shellbrook-Big River branch line of the Canadian National which was completed in 1910. Meadow Lake is served by a Canadian National Railway line built in 1931. This line joins

the Shellbrook to Big River line at Debden. In 1932 the Meadow Lake line at Panton was connected up with the Turtleford-Shellbrook line at Medstead.

The Loon Lake and Goodsoil-Pierceland areas are not serviced directly by a railway line and all commodities have to be trucked into and out of the districts. About 44 miles of the projected St. Walburg-Bonnyville line which would pass through both Loon Lake and Pierceland, were built in 1931 and approximately 25 miles were graded at the same time from Beaver Crossing in Alberta to Pierceland.

Figure 5.—DATES OF COMPLETION OF RAILROADS IN NORTHERN AREAS OF THE PROVINCE OF SASKATCHEWAN



Courtesy of the Canadian National and Canadian Pacific Railways.

The average distance of settlers from their shipping point in the north-eastern area was 4·8 miles. This ranged from an average distance of 3·4 miles at Crooked River to 6.0 miles at Preeceville-Lintlaw. The most frequent distant was for the interval of 0 to 4 miles in each area and the next highest was the 5 to 8 mile group. There were 9 settlers over 12 miles from a shipping point at Preeceville-Lintlaw but none were beyond this distance in the other areas.

In the northwestern area on the other hand most settlers were a long distance from a shipping point. The average distances from the shipping point at Meadow Lake, Loon Lake and Goodsoil-Pierceland was 19·2, 33·0 and

60·4 miles respectively. At Meadow Lake 62·0 per cent of all settlers were over 12 miles from a shipping point. At Loon Lake all settlers were over 17 miles and the most frequent distance was from 29 to 32 miles. Settlers in the Goodsoil-Pierceland area were at least 45 miles from a shipping point and the most frequent distance was 57 to 60 miles. The situation at Big River was comparable with that in the northeastern area. Settlers in that area averaged 4·5 miles from a shipping point and only 2 settlers were over 12 miles distant.

In all unorganized territory of the pioneer areas the construction and maintenance of market roads has been under the supervision of the Northern Areas Branch. This function was formerly performed by the Department of Highways but was taken over by the Northern Areas Branch of the Department of Municipal Affairs in 1938. While the progress in road building is slow and somewhat costly in wooded regions, considerable progress can be noted over a period of years. Quite satisfactory progress has been made by the Northern Areas Branch in road building in northwestern areas since 1938. Each area has a fair to moderate system of market roads. Provincial highways are fairly good at Crooked River, Aylsham-Carrot River, Big River and Meadow Lake. In the other areas, provincial highways are either non-existent or consist only of graded dirt roads.

A fair standard earth highway runs from Goodsoil and Loon Lake to St. Walburg. This highway was being resurfaced and gravelled when the field survey was under way. There is also a similar type of road from Loon Lake to Meadow Lake through North and South Makwa. The standard earth highway from Goodsoil to Pierceland is fair in dry periods. The road from Pierceland to Beaver Crossing utilizes the graded roadbed of the projected St. Walburg-Bonnyville line.

TYPES OF FARMS

While the northern pioneer region of Saskatchewan is of recent settlement, and while defined types of farming have not yet been established, certain differences in farm organization were apparent as between the several study areas. The sources of farm and non-farm income varied from area to area and there were considerable differences in the sizes of major farm enterprises.

A classification of type of farm based wholly on the sources and distribution of returns could not be used because of the variations in crop yields for the particular year. One area in particular (Big River) had crop yields in 1941 which were considerably below a normal level. It was felt therefore that a classification based on the physical set-up of the farms would give a better indication of the differences in farm type.

The classification of farms and the criteria used in the classification are indicated below. Farm returns were grouped under crop, livestock and other returns which included custom work, use of pasture and outside farm labour. Crop or livestock returns can be stated as the contributions from crops or livestock to the farm income during the year under review. Farm returns differ from farm receipts since the farmers take into account the net change in inventory of farm resources.

Non-farm returns included the net income from sales of lumber and logs, fishing and trapping, non-farm labour, pensions and gifts and other sources not associated with farm productivity.

Non-Commercial Farms

1. Self-sufficing farms—These included farms for which the value of farm produce used by the farm family exceeded the value of farm returns. In other words for these farms, the amount of products used by the family was greater than half of the total production of the farm.

2. Part-time or Supplementary Revenue farms—These were farms for which the non-farm returns were greater than farm returns.

Commercial Farms

Farms for which farm returns were greater than non-farm returns were classified as commercial farms. Three separate types of commercial farms were identified including crop, livestock and general or mixed farms. The distinction between these types were made on the basis of the relative amounts of labour spent on crop and livestock enterprises.

3. Crop farms—On these farms 75 per cent or more of the total labour requirements of the farm were used in crop production.

4. Livestock farms—These farms had 45 per cent or more of the total labour requirements of the farm used on livestock production.

5. General or mixed farms—These comprised the other commercial farms not qualifying as crop or livestock farms on the above standards.

The classification of commercial farms according to the proportion of labour used on crops and livestock was based on a separate analyses of the comparative labour requirements for crop and livestock production.

The labour required for crop farming was determined from the group of farms having at least 3 months of paid or unpaid labour in addition to the farm operator, and less than 5 productive livestock units. These settlers were considered to be devoting their time and labour almost wholly to crops, for the 6-month period of the crop season. The man equivalents per acre of cropland of these farms was ·006905 or, in other words, 0·69 of a man equivalent could take care of 100 acres of cropland.

A second group of farms, having 12 or more units of productive livestock and requiring paid or unpaid labour in addition to the farm operator were used to define the labour requirements for livestock production. The labour required for crops was deducted from the total man equivalents of the farm, at the rate of 0·69 per 100 acres of cropland, and the remaining amount of labour was assumed to be devoted to livestock production. The man equivalents of these farms was ·0447 per unit of productive livestock. On this basis one man working during the full twelve months was considered to be able to operate an average of 100 acres of cropland and care for about 7 units of productive livestock.

Table 6 shows the distribution of farms, by type, for the three zonal types. General or mixed farms constituted 36·7 per cent of all farms for all soil types, the most important of any farm type. Crop and livestock farms were about equally divided, including 23·6 and 25·7 per cent of all farms, respectively. Non-commercial farms made up 14·0 per cent of all farms and were about equally divided between self-sufficing and part-time farms.

TABLE 6.—PROPORTION OF VARIOUS TYPES OF FARMS BY SOIL ZONES, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Grey Wooded		Degraded Black		Black Soils		Total	
	No.	%	No.	%	No.	%	No.	%
Self Sufficing	39	5·7	7	1·0	2	0·3	48	7·0
Part Time	41	6·0	7	1·0	.....	.....	48	7·0
Crop	68	9·9	83	12·1	11	1·6	162	23·6
Livestock	137	19·9	35	5·1	5	0·7	177	25·7
General or Mixed	155	22·6	86	12·5	11	1·6	252	36·7
Total	440	64·1	218	31·7	29	4·2	687	100·0

The highest proportions of general or mixed and livestock farms were located on grey wooded soils while the greatest proportion of crop farms were found on degraded black and black soils. Self-sufficing and part-time farms were confined almost wholly to the grey wooded soils. As between areas, the highest proportion of self-sufficing farms were located in the Crooked River area where 22.4 per cent of all farms in the sample were of this type. The highest proportion of supplementary revenue or part-time farms were at Big River and Crooked River, and included 25·0 and 12·2 per cent of all farms, respectively.

In the Aylsham-Carrot River, Bjorkdale-Carragana and Meadow Lake-Makwa districts, 40·4, 38·0 and 30.0 per cent respectively, of the farms were crop farms. This was in direct contrast to the 7·8 per cent of crop farms at Loon Lake and 10.0 per cent at Preeceville-Lintlaw.

At Preeceville-Lintlaw, Goodsoil-Pierceland and Loon Lake, 51·4, 43·6 and 40·6 per cent respectively, of all farms were classed as livestock farms. In the Aylsham-Carrot River and Bjorkdale-Carragana areas relatively few farms were classed as livestock farms although 47·9 and 37·3 per cent respectively, were general or mixed farms. Large proportions of farmers in the Meadow Lake-Makwa and Loon Lake areas were following a program of mixed grain and livestock production. In summary, crop farms were most important in the Bjorkdale-Carragana district, livestock farms in Preeceville-Lintlaw, Big River and Goodsoil-Pierceland. Other commercial farms, the crop-livestock combinations, were the predominant type at Aylsham-Carrot River, Meadow Lake-Makwa and Loon Lake. Self-sufficing farms were most important at Crooked River and part-time farms at Big River.

Most of these areas can still be considered in the pioneering stage although this is not true for the farms on silty clay loam soils near Armley and Aylsham. It will take a considerable period of time for these regions to develop the types of farming to which they are adapted.

The self-sufficing and part-time farms (non-commercial) were the smallest sized farms, averaging 36 and 54 acres of cropland respectively. Livestock farms were only a little larger, averaging 60 acres of cropland. The crop farms were the largest, averaging 182 acres, while the general or mixed farms comprised an average of 140 acres of cultivated land.

The highest proportion of farms whose operator previously resided in northern Saskatchewan were classified as general or mixed and crop farms. Settlers who came from southern Saskatchewan were predominantly following a general or mixed and livestock type of farm. Those coming from Europe were definitely livestock farmers.

THE PEOPLE AND THEIR LAND

An examination of the characteristics of the farm people in the pioneer region of northern Saskatchewan is of considerable importance in a discussion of the progress of settlement in the area. The characteristics of these people and the conditions which induced their settlement may to a large extent explain the degree of their success in the pioneer region.

Previous Residence of Settlers

According to the information supplied by the settlers, 31·0 per cent had resided in farming districts of southern Saskatchewan previous to their settlement in the pioneer region. Over two-fifths of the settlers, (44·7 per cent) came from other parts of northern Saskatchewan. A larger proportion of the settlers in the northwestern than in the northeastern area had previously resided in southern Saskatchewan. At Big River and Meadow Lake-Makwa, 50·0 and

51·5 per cent, respectively, of the settlers were in this class. The lowest proportion of settlers from the southern part of the province was at Preeceville-Lintlaw. This area had 9·3 per cent of settlers who had come to the area from Europe. At Loon Lake and Goodsoil-Pierceland, 21·8 and 23·1 per cent were settlers from Europe. In all areas, settlers from Europe were located predominantly on grey wooded soils.

Chief Vocation Previous to Starting on Present Farm

A total of 535 settlers, or 77·9 per cent, reported farming as their chief vocation previous to starting on their present farm. This proportion was higher for the northeast than for the northwest and higher for settlers now on general or mixed farms than for those on other types of farms. Only 56·3 per cent of the supplementary revenue or part-time farmers had had farming experience. A relatively large proportion of the part-time farmers were previously lumberjacks, trappers or fishermen. Grouped according to size of farm (acres of cropland), an increasing proportion of settlers counted farming as their previous vocation as the size of farm increased.

Extent of Previous Farming Experience

Only 7·6 per cent of the 687 settlers had not had some previous farm experience. About one tenth had between one and three years of experience, prior to starting on their present farms while about two-thirds of all settlers had at least ten years of farming experience before starting on the present farms. Settlers in the Aylsham-Carrot River, Meadow Lake-Makwa and Loon Lake area had the longest periods of farming experience. Settlers located on degraded black had a longer period of farming experience than those on grey wooded soils, while settlers on black soils had a longer period of experience than operators on the degraded black soils. There was no significant relationship of present type of farm with previous farming experience.

Method of Acquisition of Land

The methods by which settlers acquired their first parcel of land for settlement in the pioneer region are shown in table 7. Free grants of land (i.e. homesteads, pre-emptions and soldier's grants) made up 59·8 per cent of all acquisitions. The proportion of parcels acquired by this method varied from 37·4 per cent at Preeceville-Lintlaw to 89·7 per cent at Goodsoil-Pierceland. The acquisition of land by legacy was of greatest relative importance at Preeceville-Lintlaw. In many cases, particularly for settlers of Ukrainian nationality, the present farms had been handed by fathers to the present operators.

Operators who had acquired their first parcel by purchase were more numerous at Aylsham-Carrot River and at Preeceville-Lintlaw. In the former area, settlers had relatively large assets when coming to the area and purchased partially improved farms. In the latter area, the present farm operators were farmers' sons who had purchased land which had been homesteaded previously by other operators.

Age of Operators when Starting on Farm

Most of the settlers in the northern pioneer areas were comparatively young when commencing farming operations there. Two-thirds of the settlers were less than 40 years of age and about two-fifths were less than 30 years. Only 11·2 per cent of the operators were over 50 years old. At Preeceville-Lintlaw 78·5 per cent of the farm operators were less than 40 years of age when starting on

TABLE 7.—METHOD OF ACQUISITION OF FIRST PARCEL OF LAND, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

Method of Acquisition	Northeast									
	Preeceville-Lintlaw		Bjorkdale-Carragana		Crooked River		Aylsham-Carrot River		Total Northeast	
	No.	%	No.	%	No.	%	No.	%	No.	%
Homstead	39	36·5	63	47·0	28	57·2	34	36·2	164	42·7
Homestead and Pre-emption	...	...	...	...	...	...	...	...	...	...
Soldier's Grant	1	0·9	7	5·2	1	2·0	2	2·1	11	2·9
Purchase	52	48·6	55	41·1	18	36·7	46	48·9	171	44·5
Legacy	10	9·3	2	1·5	1	2·0	1	1·1	14	3·6
Rented land only	5	4·7	7	5·2	1	2·1	11	11·7	24	6·3
Total	107	100·0	134	100·0	49	100·0	94	100·0	384	100·0

Method of Acquisition	Northwest										Total All Survey	
	Big River		Meadow Lake-Makwa		Loon Lake		Goodsoil-Pierceland		Total Northwest			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Homestead	43	67·2	71	73·2	49	76·6	70	89·7	233	76·9	397	57·8
Homestead and Pre-emption	...	...	...	...	...	...	...	...	...	...	...	...
Soldier's Grant	2	3·1	1	1·0	...	...	...	...	3	1·0	14	2·0
Purchase	15	23·5	21	21·7	13	20·3	6	7·7	55	18·1	226	32·9
Legacy	2	3·1	...	...	...	...	1	1·3	3	1·0	17	2·5
Rented land only	2	3·1	4	4·1	2	3·1	1	1·3	9	3·0	33	4·8
Total	64	100·0	97	100·0	64	100·0	78	100·0	303	100·0	687	100·0

the present farm. At the other extreme was Crooked River, where only 57·1 per cent were less than 40 years of age. The areas with the highest proportion of settlers of greater age were Big River and Crooked River with 17·2 and 16·4 per cent respectively, of the farm operators being over 50 years of age when starting farming. On the other hand only 6·4 per cent of the settlers at Goodsoil-Pierceland were over 50 years of age. A larger proportion of the settlers on the grey wooded soils were less than 40 years old at start than those on degraded black and black soils. Farm operators on farms now classified as non-commercial farms, either self sufficing or part-time farms, were older on the average at the start than settlers on commercial farms.

Number of years on present farm

The average number of years on present farm for settlers included in the sample was 13·0 years for the northeast and 11·0 years for the northwest. The settlers at Preeceville-Lintlaw had been on their present farms for an average of 16 years, at Aylsham-Carrot River about 13 years, and at Bjorkdale-Carragana and Crooked River about 11 years. In the northwest settlers had been on their farms for an average of 10 years at Goodsoil-Pierceland and 11 years in the other areas. Settlers at Meadow Lake on the black clay loam soils settled there about 1929.

Settlers on farms classed as commercial farms had spent an average of 12·4 years on their farms compared with 10·2 years for non-commercial farms.

Tenure of farm operators

The proportion of settlers owning their farms was 70·6 per cent of the total. Generally the proportion was higher in the northeastern area than in the northwestern area (Table 8). In the northeast the highest proportion of owner operators was 85·0 per cent at Preeceville-Lintlaw and only 61·9 per cent at Bjorkdale-Carragana. At Big River in the northwest, owner-operators were 73·5 per cent compared with 54·7 per cent at Loon Lake.

The highest proportion of settlers owning land and renting additional land was 33·6 per cent at Bjorkdale-Carragana and 42·2 per cent at Loon Lake. This was brought about by many settlers renting lands owned by individuals who had joined the Armed Forces. Except for the low proportion of part owners at Preeceville-Lintlaw and at Aylsham-Carrot River, the remaining districts had about the same proportional number of part owners.

Tenant operation was highest in the Aylsham-Carrot River district, which has reached a relatively advanced stage of development. For this district 11·7 per cent of the settlers included in the survey were tenants.

TABLE 8.—SUMMARY OF TENURE BY DISTRICTS, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

District	Owners		Part-Owners		Tennants		Total	
	No.	%	No.	%	No.	%	No.	%
Preeceville-Lintlaw	91	85·0	10	9·4	6	5·6	107	100·0
Bjorkdale-Carragana	83	61·9	45	33·6	6	4·5	134	100·0
Crooked River	35	71·4	13	26·5	1	2·1	49	100·0
Aylsham-Carrot River	71	75·5	12	12·8	11	11·7	94	100·0
North East Area	280	72·9	80	20·8	24	6·3	384	100·0
Big River	47	73·5	15	23·4	2	3·1	64	100·0
Meadow Lake	67	69·0	26	26·9	4	4·1	97	100·0
Loon Lake	35	54·7	27	42·2	2	3·1	64	100·0
Goodsoil-Pierceland	56	71·8	21	26·9	1	1·3	78	100·0
North West Area	205	67·6	89	29·4	9	3·0	303	100·0
All Survey	485	70·6	169	24·6	33	4·8	687	100·0

Net Worth when Starting on Present Farm

The net worth of settlers when starting on their present farm averaged $1,159 per settler. The total assets amounted to $1,186 per settler and total liabilities were only $27 per settler. The debt burden of these settlers at the time of starting was therefore insignificant.

The most frequent net worth at time of starting was from $1 to $499, with 34·9 per cent of the settlers being included in this range. The average net worth for this group was $211. This compares with a net worth of $201 for the most typical group at Albertville-Garrick[1]. Quite a number of farmers (136 or 19·8 per cent) had a net worth of between $500 and $999, and 150 and 21·8 per cent had between $1,000 and $1,999. A total of 111 settlers or 16·2 per cent had a net worth of over $2,000 at the time they started on their present farms.

[1] An Economic Study of Land Settlement in the Albertville-Garrick Area of Northern Saskatchewan.

The average net worth of settlers at date of settlement on these farms ranged from $694 for settlers in the Preeceville-Lintlaw area up to $1,571 in the Aylsham-Carrot River area and $1,595 at Meadow Lake-Makwa. The average beginning net worth also varied for the zonal and textural soil types. The settlers on black clay loam soils (Meadow Lake) had an average net worth when they started of $2,020, on the degraded black soils $1,295 and on the grey wooded soils $1,035 (table 9). Settlers on sand to fine sandy loams in the grey wooded soil zone (mainly at Bjorkdale-Carragana and Aylsham-Carrot River) had an average beginning net worth of $1,303 compared with $968 for settlers on light loams to loams and only $603 for settlers on the clay loam to clay soils. The same relationship held true for the various textural types of the degraded black soils although the average valuations were much higher.

TABLE 9.—NET WORTH STATEMENT AT DATE OF SETTLEMENT, BY TYPE OF SOIL, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Grey Wooded Soils							
	Sand to fine sandy loams		Loams		Clay loams and clays		Total Grey Wooded	
Number of records	125		281		34		440	
	$	%	$	%	$	%	$	%
Real estate	32	2·4	4	0·4	.....	.....	12	1·1
Livestock	351	26·6	251	25·6	128	21·2	269	25·7
Equipment	316	24·0	212	21·6	112	18·6	234	22·3
Feed, supplies, and seed	7	0·5	6	0·6	.....	.....	6	0·6
Other assets	613	46·5	509	51·8	363	60·2	527	50·3
Total Assets	1,319	100·0	982	100·0	603	100·0	1,048	100·0
Total Liabilities	16	.....	14	.....	.....	.....	14	.....
Net Worth at Start	1,303		968		603		1,035	

—	Degraded Black Soils								Black Soils	
	Sand to fine sandy loams		Loams		Clay loams and clays		Total Degraded Black		Clay loams	
Number of records	18		76		124		218		29	
	$	%	$	%	$	%	$	%	$	%
Real estate	.....	.....	.....	.....	2	0·2	1	0·1	.....	.....
Livestock	476	25·3	334	26·2	315	24·4	335	25·1	518	24·0
Equipment	844	44·9	385	30·2	337	26·1	396	29·7	308	14·2
Feed, supplies, and seed	6	0·3	1	0·1	10	0·8	7	0·5	.....	.....
Other assets	554	29·5	553	43·5	625	48·5	594	44·6	1,335	61·8
Total Assets	1,880	100·0	1,273	100·0	1,289	100·0	1,333	100·0	2,161	100·0
Total Liabilities	3	.....	21	.....	53	.....	38	.....	141	.....
Net Worth at Start	1,877		1,252		1,236		1,295		2,020	

The value of livestock and of machinery and equipment was highest at Aylsham-Carrot River. "Other" assets at start were moderate in all areas. These assets, made up mainly of net equities in land in other parts of the province, cash on hand, accounts receivable, household goods, investments, etc., averaged $896 and $828 at Meadow Lake-Makwa and Big River, respectively, and about $550 in other areas.

Only four settlers had a negative net worth at start and 46 had a zero net worth. Those in the latter category were mainly on grey wooded soils at Preeceville-Lintlaw and Makwa.

Nationality and Birthplace of Farm Operators

The people of the northern pioneer areas include a large number of national groups. The racial and cultural characteristics of these various national groups probably bear an important relation to types of farming and the economic and social well being of settlers in various areas.

Anglo-Saxons made up 40·1 per cent of the settlers in the northeastern area and 32·6 per cent in the northwestern area. In the Aylsham-Carrot River area 48·3 per cent of the people were Anglo-Saxons. The other national groups of importance were the Dutch and Belgian, French, Scandinavian, Ukrainian, Polish and Russian and the German and Central European group.

At Preeceville-Lintlaw the Ukrainian, Polish and Russian group, which were mainly Ukrainians, included 49.5 per cent of the settlers. Anglo-Saxons and Scandinavians were the important lesser groups. The Preeceville-Lintlaw and the Aylsham-Carrot River areas represent the extremes in the northeastern area in regard to the distribution of settlers between Continental European and Anglo-Saxon nationalities.

Settlers of German nationality predominate in the districts of the northwestern area. At Goodsoil-Pierceland, 51·3 per cent of the people were of German origin. Anglo-Saxons made up only 13·8 per cent and the Ukrainian, Polish and Russian group included 18·0 per cent. Settlers of German extraction were also the major national group at Meadow Lake-Makwa and Loon Lake. At Meadow Lake-Makwa settlers of German nationality constituted 22·7 per cent and at Loon Lake, 34·4 per cent of all settlers.

There was a relationship between the national origin of settlers and the type of farming. Anglo-Saxons predominated on the crop farms, while German, Ukrainian, Russian, Scandinavians predominated on livestock and general or mixed farms.

The country of birth, in general, corresponded closely with national origin. A considerable proportion of the settlers of Anglo-Saxon nationalities were born in various parts of Canada, and were second or third generation Canadians. The proportion of settlers who were Canadian born varied from 52·1 per cent at Aylsham-Carrot River to 18·0 per cent at Goodsoil-Pierceland. Settlers born in Europe included 67·9 per cent of all settlers at Goodsoil-Pierceland, 46·8 per cent at Loon Lake, and 40·2 per cent at Preeceville-Lintlaw.

The proportion of settlers born in the United States varied from 28·9 per cent at Meadow Lake-Makwa to 6·2 per cent at Big River, and averaged 14·6 per cent for the other areas.

Settlers born in the British Isles constituted 9·7 per cent of all settlers in the survey. At Aylsham-Carrot River 16·0 per cent were from the British Isles, at Bjorkdale-Carranga, 15·7 per cent, while in the Goodsoil-Pierceland district only one settler out of the sample of 78 came from Great Britain.

Education

The educational standard of settlers probably has some significance in an appraisal of the characteristics and progress in land settlement. Table 10 shows the distribution of settlers in each area of the study according to the standard of education which they attained. It was felt that the educational standard of both the man and wife would be important in considering the effect of education on the planning and management of the farm business. For this

TABLE 10.—WEIGHTED EDUCATION OF FARM OPERATOR AND WIFE ACCORDING TO AREA, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

Weighted Education	Northeast									
	Preeceville Lintlaw		Bjorkdale-Carragana		Crooked River		Carrot River		Total Northeast	
	No.	%	No.	%	No.	%	No.	%	No.	%
Grades 0–3	24	22·4	13	9·7	5	10·2	10	10·6	52	13·5
Grades 4–8	77	72·0	85	63·4	42	85·7	70	74·5	274	71·4
Grades 9–10	5	4·7	19	14·2	1	2·0	12	12·8	37	9·6
Grades 11–12	1	0·9	17	12·7	1	2·1	2	2·1	21	5·5
Over Grade 12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Number of records	107	100·0	134	100·0	49	100·0	94	100·0	384	100·0

Weighted Education	Northwest										Total All Survey	
	Big River		Meadow		Loon Lake		Goodsoil-Pierceland		Total Northwest			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Grades 0–3	5	7·8	9	9·3	3	4·7	11	14·1	28	9·2	80	11·6
Grades 4–8	46	71·9	71	73·2	50	78·1	56	71·8	223	73·6	497	72·4
Grades 9–10	10	15·6	14	14·4	9	14·1	9	11·5	42	13·9	79	11·5
Grades 11–12	2	3·1	2	2·1	2	3·1	1	1·3	7	2·3	28	4·1
Over Grade 12	1	1·6	1	1·0	.....	.....	1	1·3	3	1·0	3	0·4
Number of records	64	100·0	97	100·0	64	100·0	78	100·0	303	100·0	687	100·0

reason, the weighted education of operator and wife is shown. This was determined by averaging the formal school grades attained. In general the educational standard of settlers in the pioneer region was not significantly different from that for other parts of Saskatchewan. As between areas, the average amount of formal education received by settlers was lower at Preeceville-Lintlaw and Goodsoil-Pierceland, and higher at Bjorkdale-Carragana, than for other areas. This indicates a relationship between the standard of formal education and the birthplace and national origin.

The formal education of settlers on commercial farms was higher than for settlers on non-commercial farms. It was also higher for settlers with larger-sized farms (in terms of acres of cropland) as compared with those on the small farms of less than 50 acres of cropland.

Family Composition

Conjugal State—It is common in newly settled areas to find a relatively large proportion of unmarried farm operators. A tabulation of settlers according to conjugal state showed that 17·9 per cent of all settlers in the survey were bachelors. At Crooked River and Big River, 32·7 and 34·4 per cent, respectively, of all settlers were bachelors. At Bjorkdale-Carragana which was the other extreme, only 12·0 per cent of the settlers were bachelors. A larger proportion of settlers on crop and self-sufficing farms were bachelors than on the other types of farms.

Size of families—The size of family indicated a definite relationship with the nationality of the settler. At Preeceville-Lintlaw, which had a preponderance of Ukrainian settlers, the family averaged 46·3 adult months.[1] At

[1] A person 15 years of age or over in the home for one month was considered to be equivalent to one adult month. Persons less than 15 years were given one-half this rating.

1. Light bush cover in the Meadow Lake-Makwa district.
2. A typical stand of medium to heavy bush, north of Meadow Lake.
3. Numerous swampy sections are characteristics of northern pioneer areas.
4. A 'burned over' area associated with frontier settlements, a great aid in clearing but often results in detrimental soil effects.

1

2

3

1. Undergrowth cleared out and trees 'barked' to aid in clearing light bush cover.
2. Cleared area west of Preeceville with light and medium bush in background.
3. Typical level to undulating topography and bush cover in Preeceville-Lintlaw district.

A view of the Beaver River valley north of Loon Lake or south of Goodsoil.

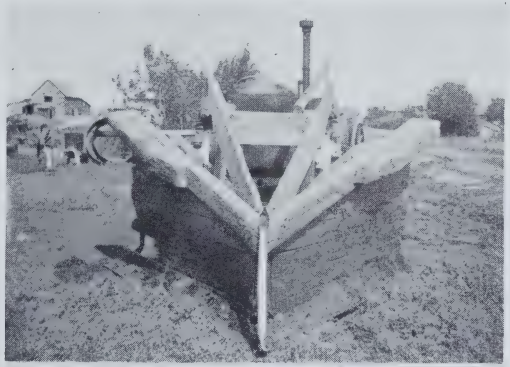
Another view of the Beaver River valley.

Medium bush cover in the Loon Lake district.

A view of Makwa Lake, typical of many similar lakes in Northern Saskatchewan.

Burned out patches in the Preeceville-Lintlaw area.

A high degree of stoniness is found on land of the 'Kakwa' soil series near Endeavour, in the north edge of the Preeceville-Lintlaw area.



1 2

3 4

1. Crude type of scrub cutter.
2. Scrub cutter at work in the Bjorkdale-Carragana district.
3. Improved type of scrub cutter capable of clearing relatively heavy bush.
4. New breaking at Meadow Lake. Note level topography and medium bush cover.

1 2

3 4

1. Log house under construction. Typical of many areas in north Saskatchewan.
2. Log house located in a beautiful setting at Chelan in the Bjorkdale-Carragana district.
3. Typical pioneer house in northwestern Saskatchewan.
4. Typical Ukrainian mud plastered log home with thatched roof in Preeceville-Lintlaw district.

1

2

3

1. Well built log home at Loon Lake.
2. Log home built of squared timbers at Loon Lake.
3. Superior type of farm home at Meadow Lake.

Boom of logs in Cowan Lake at the mill at Big River.

Mill pond and view of logs entering sawmill at Crooked River.

View of sawmill at Crooked River which provides part time employment for many settlers in this area.

Stack of lumber in settler's yard in northwestern Saskatchewan.

Pile of cordwood at Steen in Bjorkdale-Carragana district. An important source of income of new settlers.

View of a newer section of Meadow Lake.

1

2

3

4

1. Most northerly elevator in the province located at Goodsoil.
2. Packing whitefish at Big River for shipment to Chicago and other U.S. markets.
3. Main street in the hamlet of Loon Lake.
4. Fishing is an important source of income and also an attraction to tourists to visit northern lakes.

Bjorkdale-Carragana, with a preponderance of Anglo-Saxons, the family was 40·2. Here only 21·7 per cent of all settlers had 48 adult months or more as compared with 45·2 per cent at Preeceville-Lintlaw. These areas represent the extremes with regard to size of family in the northeastern area.

At Goodsoil-Pierceland and Loon Lake the average size of family was 45·5 and 44·2 adult months, respectively. Families were smaller at Meadow Lake-Makwa and Big River. At Big River the average size of family was only 34·3 adult months.

Families averaged 36·7 adult months for settlers located on crop farms, 39·1 for those on part-time farms, 43·4 those on self-sufficing farms, 43·6 for those on livestock farms and 45·3 for those on general or mixed farms.

There was a striking relationship between the weighted education of operator and wife and size of family. Where the weighted education was equivalent to three grades or less of formal education, families averaged 49·2 adult months compared with 41·9 adult months for an education rating of 4 to 8 grades, 39·8 for 9 to 10 grades, 43·7 for 11 to 12 grades and 32·0 adult months where the weighted education was over twelve grades.

HOUSING CONDITIONS IN NORTHERN PIONEER AREAS

Due to the fact that settlement in northern pioneer areas is quite recent, housing conditions are not so satisfactory as in older parts of the province. Houses are generally of log construction in contrast with the usual frame house on the prairies and in the park region.

Ratings to indicate present condition were placed on all farm houses in the study areas. These ratings are somewhat relative but are comparable as between the various areas and other surveys in prairie and park areas. Table 11 shows the distribution of farm houses according to condition for the northern area and for selected prairie and park areas.

About 56 per cent of all houses in northern areas were in poor condition in 1942 as compared with 32 per cent in park areas and 24 per cent in prairie areas. Houses in fair condition averaged about 40 per cent of all houses in the north compared with 59 and 70 per cent in park and prairie areas, respectively. Only about 4 per cent were in good condition in northern pioneer areas while about 10 and 6 per cent were in this category in park and prairie areas. The general condition of buildings was very good in the Aylsham-Carrot River area, fairly good at Bjorkdale-Carragana and Meadow Lake and poor at Goodsoil-Pierceland.

Settlers' houses were of recent construction. About 92 per cent of all houses have been built since 1923 and 47·4 per cent were built during the 1933-1942 period. At Preeceville-Lintlaw 74·3 per cent of all houses were built during the 1923-1942 period, 15·8 per cent between 1913 and 1922 and 9·9 per cent prior to that period. The only other area in which some houses were built prior to 1913 was Aylsham-Carrot River.

The average present values of settlers' houses in good, fair and poor condition were $1,054, $446 and $202, respectively. The range for the respective study areas was not wide although present values were relatively high at Meadow Lake-Makwa and relatively low at Preeceville-Lintlaw.

Farm houses were rated also from the standpoint of size. Amount of investment was given more weight than the number of rooms or the actual measurements of the house in arriving at the ratings for size. Generally speaking, houses having one, two or three rooms were rated as having a small investment, houses having four to six rooms were rated as having a medium investment and houses having six rooms or more were rated as having a large investment.

In the northern pioneer areas included in this study 63·8, 35·3 and 0·9 per cent of all settlers' houses were rated as constituting small, medium and large investments, respectively. The proportions of farm houses in comparable size groupings in prairie areas are 43·9, 51·9 and 4·2 per cent; and in park areas 46·9, 48·5 and 4·6 per cent, respectively. About 45 per cent of all houses in northern areas are of small investment and in poor condition.

TABLE 11.—DISTRIBUTION OF FARM HOUSES ACCORDING TO CONDITION IN REPRESENTATIVE AREAS OF SASKATCHEWAN, FARM BUSINESS SURVEYS, 1939–1942

Areas	Condition of Farm House							
	Poor		Fair		Good		Total	
	No.	%	No.	%	No.	%	No.	%
Prairie Area—								
Eyebrow-Lacadena	90	20·1	333	74·3	25	5·6	448	100·0
R.M. Pittville No. 169	37	29·8	77	62·1	10	8·1	124	100·0
Wilcox	22	19·7	82	73·2	8	7·1	112	100·0
Weyburn-Alameda	86	32·5	168	63·4	11	4·1	265	100·0
Blucher-Colonsay	23	15·5	112	75·7	13	8·8	148	100·0
TOTAL	258	23·5	772	70·4	67	6·1	1,097	100·0
Park Area—								
Balgonie-Qu'Appelle	26	32·5	52	63·4	2	4·1	80	100·0
Saltcoats-Churchbridge	53	26·2	133	65·9	16	7·9	202	100·0
Lashburn-Paynton	41	29·7	79	57·2	18	13·1	138	100·0
Melfort	28	27·4	59	57·9	15	14·7	102	100·0
Aylsham-Carrot River	47	50·0	39	41·5	8	8·5	94	100·0
TOTAL	195	31·6	362	58·8	59	9·6	616	100·0
Pioneer Area—								
Pleasantdale	44	61·1	28	38·9	.....	.....	72	100·0
Albertville-Garrick	173	55·3	130	41·5	10	3·2	313	100·0
Preeceville-Lintlaw	61	50·8	54	45·0	5	4·2	120	100·0
Bjorkdale-Carragana	81	60·0	44	32·6	10	7·4	135	100·0
Crooked River	25	51·0	23	46·9	1	2·1	49	100·0
Big River	29	44·6	36	55·4	.....	.....	65	100·0
Meadow Lake-Makwa	64	64·6	28	28·3	7	7·1	99	100·0
Loon Lake	28	45·9	31	50·8	2	3·3	61	100·0
Goodsoil-Pierceland	59	70·2	23	27·4	2	2·4	84	100·0
TOTAL	564	56·5	397	39·8	37	3·7	998	100·0
All Areas	1,017	37·5	1,531	56·5	163	6·0	2,711	100·0

ANALYSIS OF FACTORS AFFECTING THE PROGRESS OF SETTLERS

In a wooded pioneer region the success of settlement, from the standpoint of the economic well-being and economic progress of settlers depends to a large extent upon the amount of land which is brought under cultivation. A consideration of the factors related to the progress made in the clearing and breaking of land is therefore important in relation to an economic study of settlement.

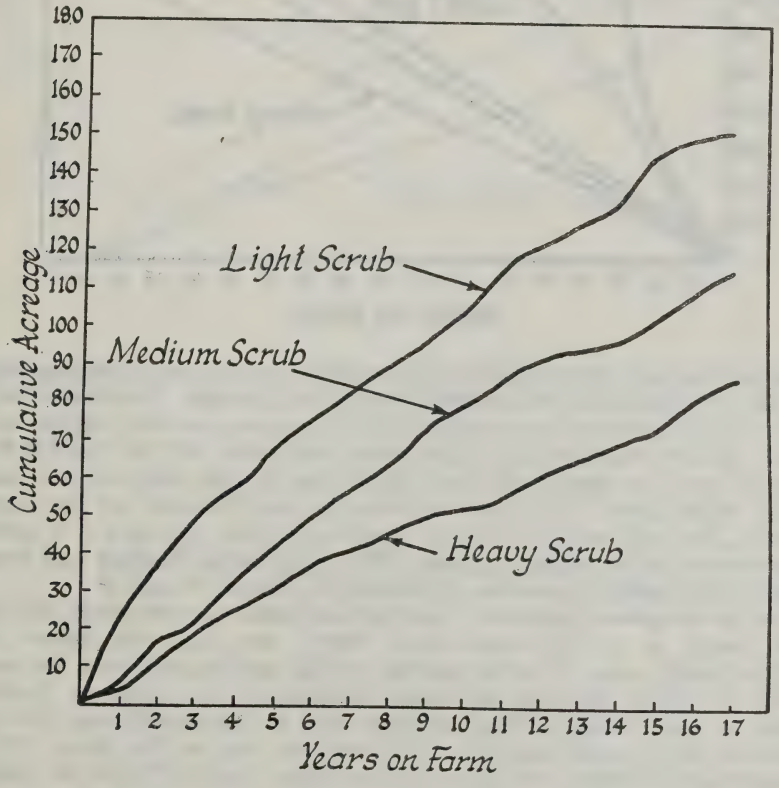
Improvement of Land

Progress of Settlers in Clearing and Breaking—In the section on vegetation the variation in types and densities of vegetation was emphasized. It is clear that these are among the more important factors related to the rate of progress in clearing and breaking land. This is borne out by Figures 6 and 7, which show the average rates of clearing and breaking land for all settlers according to the type of cover and number of years of settlement.

A little more rapid progress was made in clearing and breaking for scrub cover than for bush cover.[1] Within these types there were significant variations according to the density of cover. The average rates of clearing and breaking were 9·0, 6·8 and 5·2 acres per year for light, medium and heavy scrub respectively, and 5·2, 6·3 and 4·5 acres respectively, for light, medium and heavy bush. Relatively rapid progress was made for wild grass or meadow land and for burned over land, for which the average rates were 17·8 and 9·0 acres respectively per year.

The rates of breaking and clearing land depicted in Figure 7 require some comment. One would expect light bush cover to be cleared more rapidly than medium bush. The tendency was for farmers to clear the light bush cover first. Therefore the longer the farmer had been on his farm the less light bush cover remained to be cleared. In more recent years, the rate of land clearing has increased, largely because of the use of heavy equipment. The effect of this on the larger proportion of medium bush cover, on unimproved land would be to increase the rate of clearing on this type. Variations in degree of stoniness and topography on individual parcels of land as well as difficulty in maintaining sharp distinction between light bush cover and medium bush cover are other factors which also exert an influence on the rate of clearing.

Figure 6.—AVERAGE PROGRESS OF CLEARING AND BREAKING BY TYPE OF COVER NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

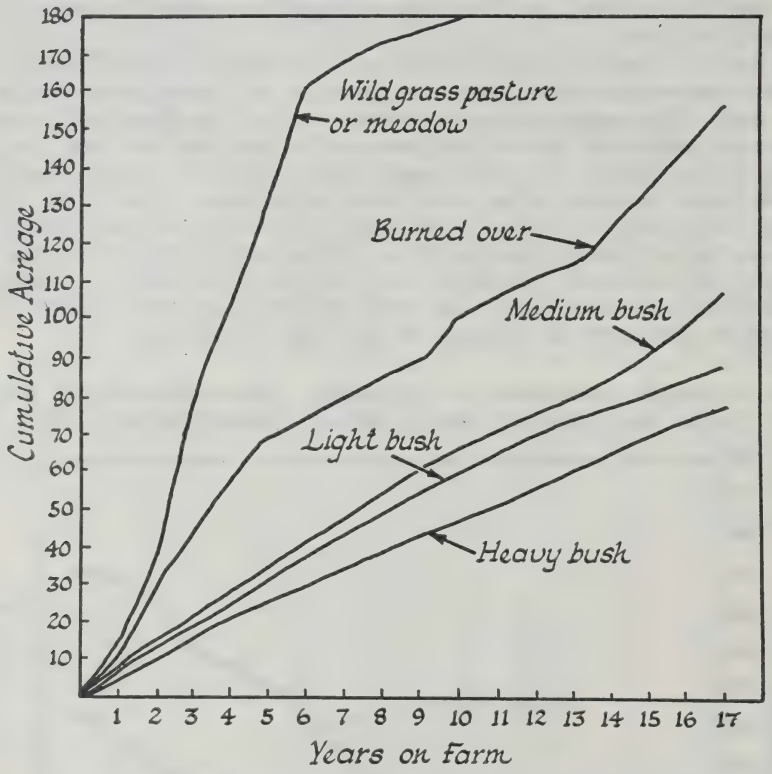


The rate of progress in clearing and breaking was considerably higher for the settlers on degraded black and black soils than for the settlers on grey

(1) See definition of scrub and bush cover page 23.

wooded soils. The average rate of clearing for black soils was 6·7 acres per year, for degraded black soils 7·4 acres, and for grey wooded soils, 4·9 acres per year.

Figure 7.—AVERAGE PROGRESS OF CLEARING AND BREAKING BY TYPE OF COVER NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942



Progress was also more rapid on light textured soils than on heavier textured soils of the grey wooded and degraded black soil groups. This was due principally to the light or more open vegetative cover associated with lighter textured soils. For the grey wooded soils, the average rates were 6·1, 4·2 and 3·9 acres per year for sandy to fine sandy loam, light loam to loam and for clay loam to clay soils, respectively. The same relationship was obtained for the degraded black soils. For this soil the average rates were 15·8, 7·6 and 6·0 acres per year for the respective textural groups. The progress in clearing and breaking according to soil texture is shown graphically in Figures 8 and 9.

When the progress of settlers in the various areas was compared, the highest rate was found in the Aylsham-Carrot River area and the lowest in the Preeceville-Lintlaw area. For the districts in the northeastern area the average rates were 2·9 acres per year at Preeceville-Lintlaw, 6·6 acres at Bjorkdale-Carragana, 4·2 at Crooked River and 9·4 acres at Aylsham-Carrot River. In the northwest the average rates were 3·6 acres per year at Big River, 7·0 acres at Meadow Lake-Makwa, 5·3 acres at Loon Lake, and 6·7 acres at Goodsoil-Pierceland.

While the areas cleared in the earlier years of settlement included a somewhat larger proportionate amount of light scrub cover, there has been little change in the relative distribution according to vegetative cover of the areas broken since 1931. This is shown in table 12.

Costs of Clearing and Breaking—The analysis of the progress of clearing and breaking land included a study of the costs of clearing and breaking.

Figure 8.—AVERAGE PROGRESS OF CLEARING AND BREAKING FOR GREY WOODED SOILS BY TEXTURAL GROUPS NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

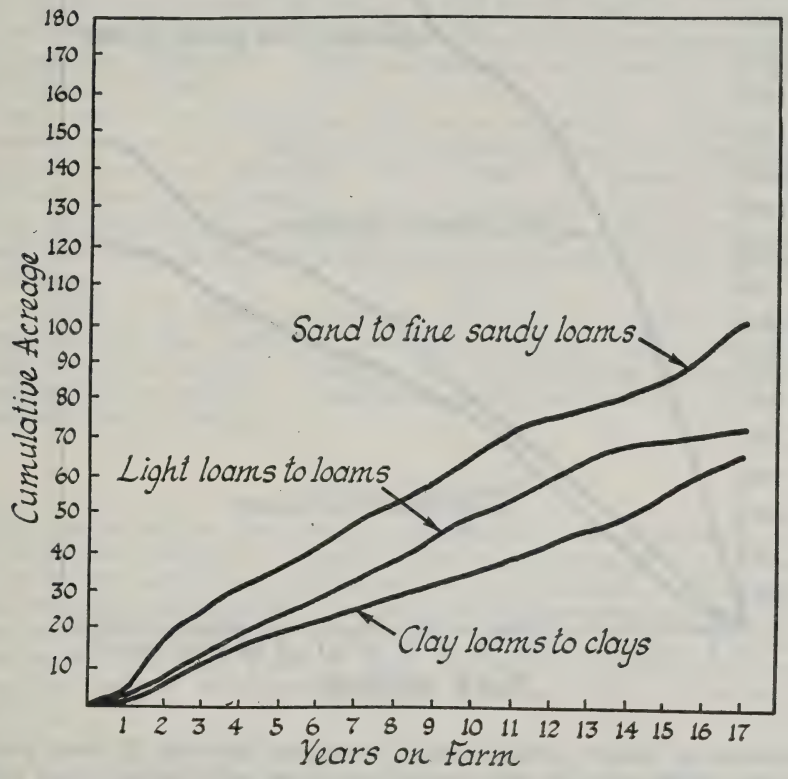
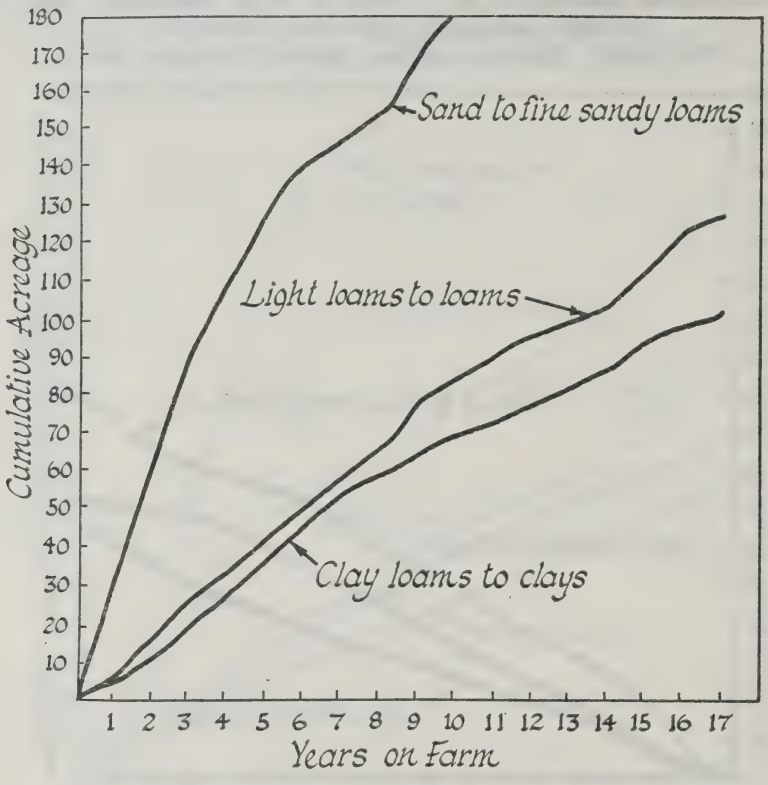


TABLE 12.—PERCENTAGE DISTRIBUTION OF CLEARING AND BREAKING FOR ALL TYPES OF COVER FOR THE PERIOD 1931-1941, NORTHERN PIONEER AREAS, 1942 SURVEY

Year	Predominant Type of Cover								
	Light scrub	Medium scrub	Heavy scrub	Light bush	Medium bush	Heavy bush	Wild grass pasture or meadow	Peat or spruce muskeg	Burned over
	%	%	%	%	%	%	%	%	%
1941	8·0	6·0	7·0	23·0	37·5	11·0	4·0	.....	3·5
1940	6·8	5·4	6·4	23·5	39·9	13·2	2·6	.....	2·2
1939	6·5	7·7	5·0	26·3	39·3	10·8	2·5	.....	1·9
1938	8·6	5·1	5·0	23·5	42·0	13·1	0·3	.....	2·4
1937	5·1	6·3	5·0	24·6	42·3	14·5	0·6	.....	1·6
1936	7·5	7·5	6·9	18·9	43·8	12·8	1·1	.....	1·5
1935	7·9	7·9	7·2	25·0	36·9	12·8	1·2	.....	1·6
1934	9·5	5·4	6·2	24·4	38·4	14·9	0·4	.....	0·8
1933	9·4	5·8	6·7	21·1	39·5	15·7	0·9	.....	0·9
1932	11·1	5·8	4·9	24·4	37·8	13·8	0·9	.....	1·3
1931	10·3	6·4	7·4	22·1	34·1	16·4	2·0	.....	1·3
1931–1941	8·1	6·3	6·1	23·4	39·4	13·5	1·5	.....	1·7

Figure 9.—AVERAGE PROGRESS OF CLEARING AND BREAKING FOR DEGRADED BLACK (TRANSITION) SOILS BY TEXTURAL GROUPS NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942



Cash costs of clearing show distinct variations by type of cover for the various areas. Sufficient data were available to show only the cash costs during the last five-year period (i.e. 1937-1941). In table 13 this information is shown for areas in the northeast and northwest according to the type and density of tree cover. The cash costs include the hiring of labour and equipment.

In the northwestern area the cash costs of clearing varied from an average of $2.02 per acre for light scrub to $5.11 for heavy bush. Corresponding rates were on a higher scale in the northeastern areas. Here cash costs of clearing varied from $4 per acre for light scrub to $9.82 for heavy bush.

TABLE 13.—CASH COST OF CLEARING PER ACRE FOR THE VARIOUS TYPES OF COVER, FIVE-YEAR PERIOD, 1937-1941, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Light scrub	Medium scrub	Heavy scrub	Light bush	Medium bush	Heavy bush
	$	$	$	$	$	$
Northwest	2.02	2.29	3.49	3.03	4.42	5.11
Northeast	4.00	4.45	6.86	6.00	6.93	9.82
Whole area	3.42	3.69	5.08	3.70	5.62	6.45

The higher cash costs of clearing in the northeast areas seemed to be due in part to higher labour costs. While figures on labour costs were not available for the five-year period, rates of paid labour in 1941 on farms indicate higher rates in the northeast areas. The wages for paid labour for terms of six months or less were $31.54 per month for the northeast area compared with only $27.48 for the northwest area. For terms of more than six months wages were $28.81 per month for the northeast and $22.83 per month for the northwest.

Cash costs of clearing have decreased substantially since the early period of settlement (i.e. 1929-1930). Data compiled for the Albertville-Garrick area clearly show this trend.[1]

Cash costs of breaking showed little or no variation according to the type and density of tree cover. The rate for breaking seemed to be standardized in each area and averaged about $5 per acre. Due to the gradual increase in the use of mechanized power, breaking costs have also decreased in recent years.

The total cash costs of clearing and breaking varied for the different types of cover from about $7 to $10 per acre in the northwest and from $9 to $15 in the northeast.

In addition to the costs of clearing and breaking, the preparation of land for cropping requires the picking of roots and stones, as well as some surface working, usually in the form of disking. All these operations involve a considerable expenditure of cash or a considerable expenditure of effort on the part of the operator and his family.

Sizes of Farms

The quarter-section farm was the most typical size of farm in all areas except Bjorkdale-Carragana. For all the areas, 49·4 per cent of the settlers were located on farms of one quarter-section or less in area, 30·4 per cent were on half-section farms, 12·4 per cent on three-quarter-section farms and only 7·8 per cent were located on farms of one section or larger. At Bjorkdale-Carragana 33·6, 40·3, 15·7 and 11·4 per cent of the settlers operated quarter-section, half-section, three-quarter-section and one-section or larger farms, respectively.

In the Preeceville-Lintlaw and Crooked River areas 65 per cent were quarter-section farms and only about 2·4 per cent included 640 or more acres of land. According to soil, 53·9, 29·5, 10·7 and 5·9 per cent of the farms on grey wooded soils were quarter-sections, half-sections, three-quarter-sections and farms of one section or larger, respectively. For the degraded black and black soils the corresponding proportions were 39·4, 32·6, 16·5 and 11·5 per cent.

Of the self-sufficing farms 75 per cent were quarter-sections, and of the part-time farms, 70·8 per cent. For the group of commercial farms, 65 per cent of the livestock farms, 39·3 per cent of the mixed and general, and only 34·0 per cent of the crop farms were 160 acres or less in area. Approximately one-third of the farmers on crop farms operated three-quarter-sections or more, compared with 26·2 per cent for those on general farms and only 8·4 per cent for those on livestock farms.

At Preeceville-Lintlaw the average size of farm was 234 acres with 73 acres improved; at Bjorkdale-Carragana, 312 acres with 126 acres improved; at Crooked River, 231 acres with 78 acres improved; and at Aylsham-Carrot River, 315 acres with 244 acres improved. In the northwest areas the average sizes of farm units were 275, 305, 294 and 271 acres for the Big River, Meadow Lake-Makwa, Loon Lake and Goodsoil-Pierceland areas, respectively. Improved acreages averaged 78, 126, 86 and 90 acres for the respective areas.

[1] An Economic Study of Land Settlement in the Albertville-Garrick Area of Northern Saskatchewan, pp. 38-40.

The average size of farm was 324 acres on degraded black soils and 264 acres on grey wooded soils. There was an increase in size of farm for soils of lighter textures within these zonal soil groups.

The average size of unit was 334, 324 and 224 acres, respectively for crop, general and livestock farms and 164 and 217 acres, respectively for the self-sufficing and part-time farms. About three-quarters of the 162 farms classed as crop farms, about half of the 252 general or mixed farms, and about one-tenth of the 177 livestock farms had more than 100 acres of crop land. The proportion of farms with more than 100 acres of crop land decreased to 14 per cent for the 48 supplementary revenue farms, and 4 per cent for the 48 self-sufficing farms.

Utilization of Crop Land

On northern pioneer farms the main emphasis has been placed on cash crops. This arises out of the necessity of obtaining cash for operating and capital items. Except in certain areas, the meagre resources of the settlers demands this emphasis on enterprises providing an immediate source of cash income.

Table 14 shows the use of crop land according to the zonal and textural soil types on farms. The differences in the acres of crop land are relatively significant. Farms on degraded black soils averaged 172 acres of crop land, compared with 131 for black clay loam soils and 86 for the grey wooded soils. Farms were also larger on sandy and fine sandy loams of the grey wooded and degraded black (transition) soils.

The grey wooded light loam and loam soils, which made up the largest group of the sample, are the most typical soils of the portions of the northern region which are now settled and of the portions which may be considered for prospective settlement. Farms on this soil had an average of 72 acres of crop land. The use of crop land on this soil type, as on other types, was modified somewhat in 1941 in accordance with the Wheat Acreage Reduction program initiated that year. In the Albertville-Garrick study, made a year previous to the introduction of this program, the area of summerfallow constituted 8·0 per cent of the total crop land as contrasted with 20·8 per cent for the areas visited in 1941. Most of the additional summerfallow in 1941 probably consisted of land taken out of wheat production.

Taking into account the probable effect of the Wheat Acreage Reduction program it is likely that wheat constitutes the most important single crop in the northern region. The acreage in wheat under normal conditions would probably have comprised from one-third to two-fifths of the total area of crop land.

The oat crop is important in northern areas, both as a cash crop and as grain and forage for livestock production. Oats occupied 25·6 per cent of the crop land for the grey wooded soils, and 29·2 per cent of that for the light loam to loam areas of the grey wooded soils. These proportions were somewhat higher than for farms situated on degraded black and black soils.

Barley was the third crop in importance in terms of the areas of crop land occupied.

Alfalfa is a relatively important crop in northern Saskatchewan and seems to be particularly well adapted to the grey wooded light loam to loam and clay loam soils. It occupied 11·2 per cent of the crop land on light loam to loams and 11·7 per cent on clay loams. Alfalfa production was relatively more important on farms of small size. On the above soils, 13·5 per cent of the crop land on farms with less than 50 acres of crop land was devoted to alfalfa production compared with 10·7 per cent for farms with over 200 acres of crop land.

TABLE 14.—UTILIZATION OF LAND BY SOIL GROUPS, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

	Grey Wooded Soils							
	Sand to fine sandy loams		Light loams to loams		Clay loams to clays		All grey wooded	
Number of farms	125		281		34		440	
	ac.	%	ac.	%	ac.	%	ac.	%
Total Area	289	.....	257	.....	228	.....	264	.....
Unimproved	166	.....	182	.....	149	.....	175	.....
Improved	123	.....	75	.....	79	.....	89	.....
Farmstead	3	.....	3	.....	2	.....	3	.....
Crop land	120	100·0	72	100·0	77	100·0	86	100·0
Wheat	27	22·4	18	25·0	16	20·7	21	24·4
Oats	26	21·6	21	29·2	17	21·2	22	25·6
Barley	20	16·7	5	6·9	10	13·0	9	10·5
Rye and flax	2	1·7	1	1·4	.....	.....	1	1·2
Alfalfa seed	2	1·7	3	4·2	5	6·5	3	3·5
Alfalfa hay	2	1·7	5	6·9	4	5·2	4	4·6
Other crops	5	4·2	1	1·4	3	3·9	3	3·5
Summerfallow	34	28·3	15	20·8	20	26·0	20	23·2
Breaking	2	1·7	3	4·2	2	2·6	3	3·5
Number of years on farm	11·3		12·2		11·8		11·9	

	Degraded Black (Transition) Soils								Black clay loam soils	
	Sand to fine sandy loams		Light loams to loams		Clay loams to clays		All soils			
Number of farms	18		76		124		218		29	
	ac.	%	ac.	%	ac.	%	ac.	%	ac.	%
Total Area	346	.....	336	.....	313	.....	324	.....	267	.....
Unimproved	57	.....	193	.....	135	.....	149	.....	133	.....
Improved	289	.....	143	.....	178	.....	175	.....	134	.....
Farmstead	3	.....	3	.....	3	.....	3	.....	3	.....
Crop land	286	100·0	140	100·0	175	100·0	172	100·0	131	100·0
Wheat	87	30·4	41	29·3	47	26·8	48	27·9	48	36·6
Oats	51	17·8	43	30·7	29	16·6	36	20·9	25	19·1
Barley	42	14·7	8	5·7	29	16·6	23	13·4	8	6·1
Rye and flax	4	1·4	2	1·4	3	1·7	3	1·7	.....	.....
Alfalfa seed	.....	.....	3	2·1	1	0·6	1	0·6	.....	.....
Alfalfa hay	2	0·8	3	2·1	3	1·7	3	1·7	2	1·5
Other crops	17	5·9	5	3·6	7	4·0	7	4·2	6	4·6
Summerfallow	72	25·2	32	22·9	54	30·8	48	27·9	37	28·3
Breaking	11	3·8	3	2·2	2	1·2	3	1·7	5	3·8
Number of years on farm	9·6		12·6		12·9		12·5		12·8	

The use of crop land according to type of farm is shown in table 15. Wheat was the most important crop on crop farms, particularly those located on degraded black and black soils. On livestock farms oats constituted the most important crop enterprise. To the extent that the amount summerfallow has been increased by the Wheat Acreage Reduction program it is significant that the proportion of summerfallow has increased on all types of farms except livestock farms.

TABLE 15.—UTILIZATION OF LAND BY TYPE OF FARM, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

	Type of Farm											
	Self sufficing		Supplementary revenue		Crop		Livestock		General or mixed		All Farms	
Number of farms	48		48		162		177		252		687	
	ac.	%	ac.	%	ac.	%	ac.	%	ac.	%	ac	%
Total area	164	.....	217	.....	334	.....	224	.....	324	.....	283	
Unimproved	128	.....	163	.....	149	.....	164	.....	182	.....	165	.....
Improved	36	.....	54	.....	185	.....	60	.....	142	.....	118	.....
Farmstead	.....	.....	.....	.....	3	.....	2	.....	2	.....	3	.....
Crop land	36	100·0	54	100·0	182	100·0	58	100·0	140	100·0	115	100·
Wheat	7	19·4	9	16·9	53	29·1	11	19·0	38	27·2	30	26·1
Oats	11	30·6	16	29·6	32	17·6	21	36·3	33	23·6	27	23·5
Barley	3	8·3	7	13·0	21	11·5	5	8·6	18	12·8	13	11·3
Rye and flax	.....	.....	1	1·8	4	2·2	1	1·7	1	0·7	2	1·7
Alfalfa seed	1	2·8	2	3·7	3	1·7	1	1·7	3	2·1	2	1·7
Alfalfa hay	3	8·3	4	7·4	4	2·2	3	5·2	4	2·8	4	3·5
Other crops	1	2·8	1	1·8	6	3·3	2	3·4	5	3·6	4	3·5
Summerfallow	8	22·2	13	24·0	55	30·2	10	17·2	35	25·1	30	26·1
Breaking	2	5·6	1	1·8	4	2·2	4	6·9	3	2·1	3	2·6
Number of years on farm	10·8		9·6		12·4		12·4		12·5		12·1	

The larger proportionate amounts of wheat on the types of farms associated with a larger size of farm suggests that settlers devote more of their labour to crop production as compared with livestock, as the size of farm increases.

Productivity of Land Based on Crop Histories

The yields of various grains obtained on farms included in the study probably express fairly accurately the relative productivity of the land. The yields of wheat, oats and alfalfa, which are the most important crops, can also serve to indicate the relative profitableness of farming in this region.

Crop histories were obtained from the settlers in each area and the reports were in sufficient numbers to establish a reasonable estimate of ten-year average yields.

Average Yield of Wheat.—In spite of the low natural fertility of the grey wooded soils, yields of wheat are relatively high. This is probably due to the relatively favourable moisture conditions in the forest zone of Saskatchewan, as well as the relatively high efficiency in the use of moisture resulting from lowered temperatures and the lesser effect of winds. Because of the differing moisture relationships, soil structure and soil texture are not of such importance in these areas as is the case in the prairie and park land areas of Western Canada.

It should be pointed out also that the crop yields shown by this analysis include the yields for land recently brought under cultivation. It would be necessary to obtain crop histories for a relatively longer period in order to provide a more direct comparison between the productive capacities of grey wooded and degraded black soils with prairie and park land soils.

Table 16 shows the average yields of wheat by zonal soil types for respective years, as well as the average of five- and ten-year periods. These yields compare very favourably with the sixteen-year average yields of areas in south central Saskatchewan.[1]

[1] Spence C. C., and Hope, E.C., An Economic Classification of Land in Fifty-Six Municipal Divisions, South Central Saskatchewan, complete reference see Table 2, p. 17.

The ten-year average yield for grey wooded soils was only 1·4 bushels lower than the ten-year average yield of 23·6 bushels per acre for the degraded black soils. However, when the five-year averages are compared a considerably lower average yield is indicated for grey wooded than for degraded black soils in the recent five-year period.

TABLE 16.—AVERAGE WHEAT YIELDS BY SOIL ZONES, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

Year	Grey Wooded	Degraded Black (Transition)	Black Soils	All Soils
	bus.	bus.	bus.	bus.
1941	20·2	23·8	30·8	26·7
1940	22·5	23·0	24·9	23·8
1939	24·5	29·0	30·3	28·7
1938	20·0	23·2	23·3	22·0
1937	20·4	21·0	31·4	22·8
1937–1941	21·5	24·0	28·1	24·8
1936	19·9	22·5	25·8	23·4
1935	21·5	20·2	22·2	21·2
1934	19·8	20·0	48·0	25·8
1933	21·5	25·4	50·0	25·7
1932	32·4	28·1	45·0	32·0
1932–1936	23·0	23·3	38·2	25·6
1932–1941	22·2	23·6	33·1	25·2

There was not a significant and consistent difference in yield for the different soil textural groups. As noted in table 17, the ten-year average yield for sandy to fine sandy loams for the grey wooded soils was 24·6 bushels, compared with 20·8 for the light loams to loams. It is difficult to explain this difference. Better

TABLE 17.—AVERAGE WHEAT YIELDS BY SOIL GROUPS FOR ALL TYPES OF PREPARATION, NORTHERN PIONEER AREAS, 1942 SURVEY

	Grey Wooded Soils			Degraded Black (Transition) Soils			Black Soils
	Sand to fine sandy loams	Light loams to loams	Clay loams to clays	Sand to fine sandy loams	Light loams to loams	Clay loams to clays	Clay loams to clays
	bus.	bus.	bus.	bus.	bus.	bus.	bus.
1941	18·8	19·4	20·8	21·9	24·0	22·2	30·8
1940	22·9	20·7	27·4	19·1	21·2	21·9	24·9
1939	31·8	21·1	29·5	28·4	24·0	28·4	30·3
1938	23·0	19·1	23·7	20·4	22·7	23·6	23·3
1937	25·0	18·4	16·8	11·5	22·4	20·3	31·4
1937–1941	24·3	19·7	23·6	20·3	22·9	23·3	28·1
1936	24·6	17·1	20·5	.....	17·2	25·4	25·8
1935	25·1	17·1	29·7	.....	17·1	19·4	22·2
1934	23·0	19·9	.....	27·0	20·4	22·7	48·0
1933	23·5	23·6	.....	.....	26·2	24·7	50·0
1932	28·0	32·4	37·0	28·3	30·6	26·1	45·0
1932–1936	24·8	22·0	29·1	.....	22·3	23·7	38·2
1932–1941	24·6	20·8	26·4	22·4	22·6	23·5	33·1

drainage, higher soil temperatures and a shorter maturity period for the lighter, textured soils which would result in wheat crops escaping the frost hazard are possible explanations. The ten-year average yield for clay loam to clays is not very reliable because of the small sample and incomplete estimates by years. The frost-free period is longer in the areas of grey wooded clay loam to clay soils.

With the exception of the Meadow Lake area, yields in the northwest were about 2 bushels per acre lower than in the northeast. This is probably due to the less favourable climatic factors including temperatures and frost hazards.

The differences in wheat yields as shown in table 18 by type of preparation are worthy of note. In this analysis only the yield data of areas for which the type of preparation was definitely known were included. While the information was confined mainly to the grey wooded soils, it indicates the comparative yields of wheat under breaking, summerfallow and stubble in the 1932-1941 period.

TABLE 18.—AVERAGE WHEAT YIELDS FOR ALL SOILS BY TYPE OF PREPARATION NORTHERN PIONEER AREAS, 1942

Year	Breaking	Summer-fallow	Stubble	All Prepar-ations
	bus.	bus.	bus.	bus.
1941	31·3	24·4	24·9	26·7
1940	29·2	22·5	19·6	23·8
1939	31·8	29·7	24·6	28·7
1938	25·1	22·3	19·0	22·0
1937	26·0	24·5	17·9	22·8
1937–1941	28·7	24·7	21·2	24·8
1936	26·2	25·0	19·0	23·4
1935	24·5	20·0	19·2	21·2
1934	32·1	28·3	17·1	25·8
1933	36·4	24·0	16·8	25·7
1932	43·3	26·7	26·1	32·0
1932–1936	32·5	24·8	19·6	25·6
1932–1941	30·6	24·8	20·4	25·2

TABLE 19.—AVERAGE YIELDS OF OATS BY SOIL ZONES NORTHERN PIONEER AREAS, 1942 SURVEY

Year	Podsolized soils	Degraded Black soils	Black soils	All Soils
	bus.	bus.	bus.	bus.
1941	25·4	28·8	42·5	32·2
1940	36·3	34·5	48·6	39·8
1939	45·5	49·1	55·4	50·0
1938	34·7	40·2	53·9	42·9
1937	30·4	36·2	59·5	42·0
1937–1941	34·7	37·8	52·0	41·4
1936	32·5	31·8	51·2	38·5
1935	31·9	35·5	51·2	39·5
1934	28·5	43·5	.....	36·0
1933	32·8	45·6	.....	39·2
1932	40·0	47·0	.....	43·5
1932–1936	33·1	40·7	.....	39·3
1932–1941	33·9	39·2	.....	40·4

To this extent it indicates the need of a suitable crop rotation to maintain soil fertility. The benefits of the inclusion of a legume crop in the crop rotation may be readily appreciated.

Average yields of oats.—The average yields of oats were also high in the northern pioneer region. The relatively cool temperatures and humid conditions in these areas are very favourable for oat production. In table 19, the ten-year average yields of oats are shown for the zonal soil groups. Oat yields averaged 33·9 bushels per acre on the grey wooded soils and 39·2 bushels per acre on the degraded black soils for the 1932-1941 period. A ten-year average yield for the black soils was not available but the five-year average of 52·0 bushels per acre for the 1937-1941 period was considerably in excess of that for the grey wooded and degraded black soils in this period.

Oat yields were 37·0, 35·0 and 29·3 bushels per acre for the sandy to fine sandy loam, light loam to loam and the clay loam to clay soils in the grey wooded areas, respectively. The variation of yield according to texture was not as great in the case of the degraded black soils.

The ten-year average yield of oats in the northwestern areas was 38·8 bushels per acre compared with 35·4 bushels in the northeastern areas. Yields at Meadow Lake-Makwa and at Bjorkdale-Carragana averaged 48·4 and 40·2 bushels, respectively, and only 31·3 and 30·1 bushels at Preeceville-Lintlaw and Goodsoil-Pierceland, respectively.

Average yields of alfalfa.—Yields of alfalfa in northern pioneer areas have shown a high degree of variability, particularly in more recent years. Spectacular yields have been reported from one farm and low yields from a neighbouring farm located on similar soil. Quite often luxuriant stands do not set seed and it is known that in years of relatively low rainfall and relatively high temperatures alfalfa yields tend to be higher. Generally, higher yields are reported for grey wooded soils than for degraded black soils and also for light textured soils, as compared with those of heavier texture. Recent research work has indicated that the prevalance of certain insects, notably the leaf-cutter or megachile bee, is associated with increased seed production.[1]

In table 20, the average yields of alfalfa for 1941 as obtained from the 1942 survey of northern pioneer areas are included with the 1936-1940 average yields of the Albertville-Garrick area study of 1941.

TABLE 20.—AVERAGE YIELD OF CLEANED ALFALFA SEED PER ACRE ACCORDING TO PREDOMINANT SOIL GROUP

ALBERTVILLE-GARRICK, 1941 AND NORTHERN SASKATCHEWAN PIONEER AREAS, 1942

Year	All Grey Wooded Soils	All Degraded Black Soils	All Soils
	(Pounds of clean seed per acre)		
1941	149	134	146
1940	66	82	74
1939	107	62	85
1938	256	250	253
1937	224	229	226
1936	200	150	175
Average 1936–1941	167	151	160

The average yield of alfalfa on grey wooded soils for the 1936-41 period was 167 pounds of clean seed per acre compared with 151 pounds on degraded

[1] Knowles, R. P. Scientific Agriculture, Volume 24, No. 1, pp. 29 to 50. The Role of Insects, Weather Conditions and Plant Characters in Seed Setting of Alfalfa.

black soils. The 1936-41 average yield of 160 pounds per acre for all northern soils is somewhat less than the average yields of 192 pounds of clean seed per acre indicated by a yield study for the 1932-38 period.[1] The yields during the latter period were consistently good but the figures for the first few years are based on a relatively small sample of yields.

The production of alfalfa for seed, therefore, has not as yet proved itself as a reliable source of income, and will probably continue to be subject to considerable instability. However, the use of alfalfa as a soil improvement crop and as an aid to increased livestock production will probably become increasingly important in the wooded region and particularly on the grey wooded soils.

Sources of Income of Settlers in 1941

It was indicated that settlers coming into the wooded region had relatively small amounts of capital available with which to develop their farms. Because of the relatively large amounts of capital which the development of wooded farms requires, the shortage of capital has persisted, and the needs for working capital and capital improvements have continued to compete seriously with the needs of the family. Most settlers in the northern pioneer area are still in the process of improving their farms so that the amount of the current income which is available is of real concern.

The principal source of income upon which the settler draws is the current revenue of the farm. In addition to this source there are limited amounts of income available from such sources as non-farm labour, wood, lumber, fishing and investments.

Average Farm and Non-Farm Receipts by Soil Types.—The gross receipts from farm sources averaged $810 per farm for the 440 farms on grey wooded soils, $1,436 for the 218 farms on degraded black soils and $1,708 for the 29 farms on black soils. Receipts from non-farm sources averaged $193, $207 and $126 per farm on the respective soils.

Table 21 shows the amounts and the distribution of both farm and non-farm income by individual sources for the various soil types. Crop and livestock receipts are larger in amount and represent a significantly higher proportion of all receipts for farms located on the sandy to fine sandy loams for each zonal soil type. This is due mainly to the larger size of farm (acres of cropland) on these soils (table 14).

The relatively large proportion of income from livestock and livestock product sales, (other farm produce includes mainly butter, cream and eggs) and the low proportion from the sales of wheat on all types of soils is significant. Livestock and livestock product sales constituted 42·9 per cent of total receipts on farms on grey wooded soils, 33·3 per cent on degraded black soils and 34·2 per cent on black soils. The proportion of receipts from wheat sales increased from 12·8 per cent on grey wooded soils to 21·9 per cent on degraded black soils and 27·0 per cent on black soils.

Alfalfa sales were more important on farms on grey wooded soils than for those on the degraded black and black soils, while sales of "other crops" including mainly oats and barley, were of greater importance on the degraded black and black soils.

It is characteristic of the northern pioneer region that a larger proportion of the cash income of settlers, and perhaps even a larger gross amount, should come from non-farm sources than in older settled areas. For settlers located on grey wooded soils 19·2 per cent of the cash receipts was from non-farm sources. The corresponding figure was 12·6 per cent for those on degraded black soils and only 6·9 per cent for farms on black soils.

[1] A Survey of Alfalfa Seed Production in Northern Saskatchewan, White, W. J., and Hope, E. C. Unpublished manuscript. Table 4, p. 4. Uncleaned seed converted to clean seed basis.

TABLE 21.—AVERAGE RECEIPTS PER FARM AND DISTRIBUTION OF RECEIPTS, BY SOURCE, FOR SOIL TYPES, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Grey Wooded Soils								Degraded Black (Transition) Soils								Black soils	
	Sand to fine sandy loams		Light loams to loams		Clay loams to clays		All Grey wooded soils		Sand to fine sandy loams		Light loams to loams		Clay loams to clays		Total degraded black		Clay loams to clays	
Number of farms	125		281		34		440		18		76		124		218		29	
	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
Wheat sales	183	14·7	105	11·5	116	12·8	128	12·8	698	28·0	233	15·7	390	24·1	360	21·9	495	27·0
Alfalfa sales	26	2·1	39	4·3	58	6·4	37	3·7	5	0·2	25	1·7	19	1·2	20	1·2	10	0·5
Other crop sales	65	5·2	36	4·0	34	3·8	44	4·4	365	14·7	155	10·4	196	12·1	196	11·9	139	7·6
Livestock	422	33·9	293	32·2	253	28·0	327	32·6	759	30·5	524	35·4	364	22·5	453	27·6	539	29·4
Other farm produce	86	6·9	115	12·7	62	6·8	103	10·3	104	4·2	103	7·0	85	5·2	93	5·7	88	4·8
Equipment sales	46	3·7	23	2·5	29	3·2	30	3·0	31	1·2	20	1·3	53	3·3	40	2·5	110	6·0
Custom work	57	4·6	75	8·2	46	5·1	68	6·8	176	7·1	128	8·6	88	5·4	109	6·6	100	5·4
Other	110	8·8	55	6·1	96	10·6	73	7·2	216	8·7	133	9·0	178	11·0	165	10·0	227	12·4
Total farm receipts	995	79·9	741	81·5	694	76·7	810	80·8	2,354	94·6	1,321	89·1	1,373	84·8	1,436	87·4	1,708	93·1
Non-farm receipts:—																		
Legacies and gifts	12	1·0	6	0·7	.....	.....	7	0·7	15	0·6	11	0·8	57	3·5	38	2·3	8	0·5
Pensions	28	2·2	12	1·3	25	2·8	18	1·8	7	0·3	15	1·0	33	2·0	25	1·5	.....	.....
Fishing and trapping	9	0·7	29	3·2	15	1·7	22	2·2	.....	.....	24	1·6	.....	.....	8	0·5	9	0·5
Sales of cord wood	43	3·5	18	2·0	60	6·6	28	2·8	.....	.....	1	0·1	52	3·2	29	1·8	11	0·6
Sales of pulpwood, lumber, logs	16	1·3	18	2·0	11	1·2	17	1·7	7	0·3	20	1·3	4	0·3	10	0·6	2	0·1
Other [1]	142	11·4	85	9·3	100	11·0	101	10·0	105	4·2	90	6·1	101	6·2	97	5·9	96	5·2
Total non-farm receipts	250	20·1	168	18·5	211	23·3	193	19·2	134	5·4	161	10·9	247	15·2	207	12·6	126	6·9
All sources	1,245	100·0	909	100·0	905	100·0	1,003	100·0	2,488	100·0	1,482	100·0	1,620	100·0	1,643	100·0	1,834	100·0

[1] Work in sawmills, logging camps, fire patrol and so forth.

TABLE 22.—AMOUNT AND DISTRIBUTION OF FARM AND NON-FARM RECEIPTS, BY SOURCE AND TYPE OF FARM NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Type of farm											
	Self-sufficing		Supplementary revenue or part time		Crop		Livestock		General or mixed		Total	
Number of farms	48		48		162		177		252		687	
Farm Receipts:—	$	%	$	%	$	%	$	%	$	%	$	%
Wheat sales	20	4·9	38	4·1	464	29·0	40	4·4	255	17·4	217	17·5
Alfalfa sales	11	2·7	17	1·9	50	3·1	23	2·5	28	1·9	30	2·4
Other crop sales	1	0·2	17	1·9	224	14·0	26	2·9	97	6·6	96	7·7
Livestock	95	23·1	142	15·5	256	16·0	443	49·1	503	34·2	376	30·3
Other farm produce	39	9·5	32	3·5	57	3·6	146	16·2	117	8·0	99	8·0
Equipment sales	4	1·0	26	2·8	51	3·2	8	0·9	55	3·7	37	3·0
Custom work	26	6·3	23	2·5	113	7·1	40	4·4	114	7·8	82	6·6
Other	27	6·6	61	6·6	196	12·2	45	5·0	123	8·4	109	8·8
Total Farm Receipts	223	54·3	356	38·8	1,411	88·2	771	85·4	1,292	88·0	1,046	84·3
Non-Farm Receipts:—												
Legacies and gifts	5	1·2	22	2·4	44	2·7	6	0·7	9	0·6	17	1·4
Pensions	36	8·8	83	9·1	25	1·6	3	0·3	11	0·8	19	1·5
Fishing and trapping	8	1·9	69	7·5	3	0·2	20	2·2	17	1·2	17	1·4
Sales of cordwood	74	18·0	38	4·1	13	0·8	29	3·2	26	1·8	28	2·2
Sales of pulpwood, lumber and logs	9	2·2	43	4·7	2	0·1	11	1·2	20	1·3	14	1·1
Other[1]	56	13·6	307	33·4	102	6·4	63	7·0	93	6·3	100	8·1
Total Non Farm Receipts	188	45·7	562	61·2	189	11·8	132	14·6	176	12·0	195	15·7
All Sources	411	100·0	918	100·0	1,600	100·0	903	100·0	1,467	100·0	1,241	100·0

(1) Work in sawmills, logging camps, fire patrol and so forth.

Outside sources of income included labour in sawmills, logging camps, fire patrols, and in other non-farm employment.

Sales of lumber and wood averaged $45 per farm for the grey wooded soils, $39 for degraded black soils and only $13 on black soils. Revenue from this source constituted only 1·7 per cent of the total revenue for the farms on grey wooded soils and considerably less than one per cent of that of those on the degraded black and black soils.

In the Bjorkdale-Carragana and Crooked River areas sales of cordwood, pulpwood, lumber and logs averaged about $80 per farm and labour in lumber camps and sawmills averaged approximately $113 per farm. At Big River on the grey wooded light loam to loam soils, the total revenue from non-farm sources averaged $416 per farm, or 35·0 per cent of total receipts. Fishing and trapping averaged $108 per farm on these soils at Big River. Receipts from this source were relatively unimportant in other areas. Labour in lumber camps, sawmills, fire patrol work averaged $201 for this group of farms at Big River which was also the highest of any of the areas.

Average Farm and Non-farm Receipts by Type of Farm.—The amounts and sources of cash receipts showed a close association with type of farm. This is clearly shown in table 22. Farm receipts averaged $1,292 per farm for general or mixed farms, $1,411 for crop farms, $771 for livestock farms and only $356 and $223 per farm for part-time and self-sufficing farms, respectively. Non-farm receipts were $562 per farm for part-time farms while for other types these receipts ranged from $132 to $189 per farm.

As would be expected receipts from wheat, alfalfa and other crop sales were highest on crop farms. Livestock and livestock product receipts were $589 on livestock farms, $620 on general farms and $313 on crop farms. The receipts from livestock and livestock products amounted to 65·3 per cent of all receipts for livestock farms compared with 42·3 per cent for general farms and 19·6 per cent for crop farms.

Receipts in Relation to size of Farm.—Reference has already been made to the fact that receipts were larger for farms on sandy to fine sandy loam soils due to the larger size of farm as expressed in acres of crop land. There was also a definite relationship between size of farm and farm receipts as shown in table 23. Farm receipts for farms having 50-99 acres of crop land were nearly double those for farms having less than 49 acres of crop land. Farms having between 100 and 199 acres had farm receipts averaging $1,159 per farm which was about three times as great as for farms with less than 49 acres of crop land. Farms having over 200 acres of crop land had farm receipts averaging $2,661 which was six times that for smallest sized farms.

The increase in farm receipts was related closely with the increase in wheat sales. Wheat sales for farms having over 200 acres of crop land represented 24·7 per cent of all receipts compared with 4·5 per cent for the farms with 49 acres or less of crop land.

While the amount of receipts from livestock sales generally increased with size of farm, the proportion of receipts from livestock sales reached a maximum for the farms of 50-99 acres of crop land and then declined for the larger farms. Sales of farm produce, including mainly livestock products were also of greater significance for the smaller farms.

Table 23 also serves to illustrate the importance of non-farm sources of income for the settler with a small amount of cultivated land. For the smallest group of farms (0-49 acres of crop land), approximately one-third of all receipts was from non-farm sources. The proportion of receipts from non-farm sources decreased sharply for the group of farms with 50-99 acres of crop land. For this group, in which the farms had an average of 71 acres of crop land, 16·7 per

TABLE 23.—AMOUNT AND DISTRIBUTION OF RECEIPTS, BY SOURCES AND SIZE OF FARM, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

	Size of Farm in Acres of Crop Land							
	Up to 49		50–99		100–199		200 and over	
Number of farms	191		220		169		107	
	$	%	$	%	$	%	$	%
Farm Receipts:—								
Wheat sales	27	4·5	105	11·9	253	18·8	733	24·7
Alfalfa sales	25	4·2	27	3·1	40	3·0	31	1·1
Other crop sales	18	3·0	58	6·6	77	5·7	343	11·5
Livestock sales	183	30·6	306	34·7	423	31·5	787	26·5
Other farm produce	80	13·4	103	11·7	89	6·6	141	4·7
Equipment sales	4	0·7	13	1·5	53	4·0	115	3·9
Custom work	27	4·7	65	7·4	100	7·4	187	6·3
Other	36	6·0	57	6·4	124	9·2	324	10·9
Total Farm Receipts	401	67·1	734	83·3	1,159	86·2	2,661	89·6
Non-Farm Receipts:—								
Legacies and gifts	7	1·2	9	1·0	10	0·7	64	2·2
Pensions	25	4·2	12	1·4	21	1·6	19	0·6
Fishing and trapping	17	2·8	16	1·8	16	1·2	21	0·7
Sales of cordwood	56	9·3	19	2·2	24	1·8	3	0·1
Sales of pulpwood, lumber and logs	15	2·5	10	1·1	23	1·7	8	0·3
Other[1]	77	12·9	81	9·2	92	6·8	194	6·5
Total Non-Farm Receipts	197	32·9	147	16·7	186	13·8	309	10·4
All Sources	598	100·0	881	100·0	1,345	100·0	2,970	100·0
Number of years on farm	9·6		12·3		13·1		14·8	

[1] Work in sawmills, logging camps, fire patrol and so forth.

cent of the current income of settlers came from non-farm sources. The dependence of settlers upon outside sources of revenue in the early stages of pioneering is clearly evident.

Character of livestock and other farm produce receipts.—The character of the livestock and other farm produce receipts is indicated by the classification of receipts by type of farm as shown in table 24. Hog sales provided the major portion of the receipts from livestock sales. This was particularly true for the general farms. For these farms receipts from hog sales amounted to $377 per farm or 60·8 per cent of the total receipts from livestock and other produce sales. This may be compared with $185 per farm or 29·8 per cent of livestock and other produce receipts derived from sales of cattle, milk, cream and butter.

For livestock farms the total receipts from sales of cattle, milk, cream and butter were about equal to the receipts from hog sales. On these farms receipts from cattle sales and from products produced by cattle averaged $252 per farm or 42·7 per cent of livestock and other produce receipts, while receipts from hogs averaged $273 per farm or 46·3 per cent of livestock and other produce receipts. Receipts from cream sales for livestock farms averaged $107 per farm or 18·1 per cent of all livestock and other produce receipts compared with $69 for general farms and $31 for crop farms.

A tabulation of the amounts of receipts from livestock and other produce according to size of farm showed that there was a significant increase with size of farm. This is in contrast with the situation for prairie farms on which the amount of receipts from livestock and other produce frequently shows little increase, and sometimes a decrease with increases in size of farm. Receipts from live stock and other produce amounted to $299 per farm for farms of 25-49

acres of crop land; $359 for farms of 50-74 acres, $427 for farms of 75-99 acres and $640 per farm for farms with 100-124 acres of crop land. Above this size the amount of receipts remained relatively stable until the groups of farms with over 200 acres of crop land was reached. For the 107 farms in the latter groups, receipts from livestock and other produce amounted to $928 per farm.

The proportion as well as the amount of receipts from hog sales increased with size of farm. The proportion of receipts from cattle sales remained fairly stable as size of farm increased while receipts from milk, cream and butter sales were larger proportionately on the smaller farms.

TABLE 24.—RECEIPTS FROM LIVESTOCK, LIVESTOCK PRODUCTS AND OTHER FARM PRODUCTS, BY TYPE OF FARM, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Type of Farm									
	Self sufficing		Supplementary revenue		Crop		Livestock		General or mixed	
Number of farms	48		48		162		177		252	
Livestock:—	$	%	$	%	$	%	$	%	$	%
Horses	.....	.....	6	3·4	15	4·8	11	1·9	16	2·6
Cattle	37	27·6	36	20·7	59	18·8	133	22·6	96	15·4
Sheep	2	1·5	4	2·3	2	0·6	8	1·4	6	1·0
Hogs	54	40·3	93	53·5	175	55·9	273	46·3	377	60·8
Poultry	2	1·5	3	1·7	5	1·6	13	2·2	8	1·3
Other	.....	.....	.....	.....	.....	.....	5	0·8	.....	.....
Total	95	70·9	142	81·6	256	81·7	443	75·2	503	81·1
Farm Produce:—										
Milk	.....	.....	4	2·3	.....	.....	7	1·2	6	1·0
Cream	18	13·4	7	4·0	31	9·9	107	18·1	69	11·1
Butter	9	6·7	8	4·7	7	2·2	12	2·0	14	2·3
Eggs	8	6·0	9	5·2	14	4·5	16	2·7	21	3·4
Potatoes	1	0·8	2	1·1	2	0·6	2	0·4	3	0·5
Other	3	2·2	2	1·1	3	1·0	2	0·4	4	0·6
Total	39	29·1	32	18·4	57	18·3	146	24·8	117	18·9
Total	134	100·0	174	100·0	313	100·0	589	100·0	620	100·0

Summary of Farm Expenses of Settlers in 1941

The relation of the variations shown for farm receipts to the incomes of settlers depends upon the relationships with respect to farm expenses. Such expenses include the cash expenditures necessary for carrying on the farm operations, and also the expenses involved in the maintenance and replacement of the farm capital.

Since the amounts of farm expenses are related very closely to the size of farm, the item of farm expense has been presented according to the area of the farm measured in acres of crop land. This tabulation is presented in table 25.

Farm expenses increased appreciably as the size of farm increased. However, the expenses per acre of crop land decreased with increase in size of farm. In other words, the larger sized farms showed an increased efficiency compared with the small farms.

The largest single item of operating expenses was hired farm work which constituted 16·5 per cent of the total operating expenditures for all farms. This was followed by tractor expenses (11·7 per cent), taxes (8·4 per cent) and hired labour (7·7 per cent). Other expenses, which included a number of miscellaneous items such as feed purchases, veterinary and medicines, twine, blacksmithing,

hardware, building and fencing repair, rent of pasture, telephone, seed treatment and cleaning, comprised about one-quarter of the total operating expenditures.

In relation to size of farm, taxes remained relatively stable; tractor, separator, auto and truck costs, and the cost of hired labour increased, while most of the other items of operating expense decreased relatively with increasing size of farm.

Capital expenditures increased significantly as the size of farm increased and were reflected in relatively large increases in inventory for the large farms.

TABLE 25.—AVERAGE FARM EXPENSES PER FARM BY SIZE OF FARM, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

	Acres of Cropland									
	49 or less		50–99		100–199		200 and over		Total	
Number of farms	191		220		169		107		687	
	$	%	$	%	$	%	$	%	$	%
Taxes on real estate	21	8·5	32	8·2	50	8·0	113	8·9	46	8·4
Seed purchased	10	4·1	12	3·1	19	3·0	37	2·9	17	3·1
Tractor costs	7	2·8	21	5·4	64	10·2	255	20·1	64	11·7
Combine and separator	.....	.....	1	0·3	4	0·64	17	1·3	4	0·7
Auto, farm use	3	1·2	4	1·0	12	1·9	29	2·3	10	1·8
Truck costs	2	0·8	5	1·3	26	4·2	49	3·8	16	2·9
Farm work	41	16·7	78	19·9	118	18·9	160	12·6	90	16·5
Paid labour	6	2·4	21	5·4	33	5·3	161	12·7	42	7·7
Board of paid labour	1	0·4	4	1·0	5	0·8	27	2·1	7	1·3
Other cash expenses	75	30·5	111	28·3	151	24·2	264	20·8	134	24·5
Total Cash Expenses	166	67·5	289	73·7	483	77·3	1,112	87·5	430	78·8
Board of unpaid labour	11	4·5	15	3·8	21	3·4	24	1·9	17	3·1
Unpaid labour	59	28·0	88	22·4	122	19·5	135	10·6	99	18·1
Total Operating Expenses	246	100·0	392	100·0	626	100·0	1,271	100·0	546	100·0
Capital expenditures	129	.....	208	.....	301	.....	715	.....	288	.....
Decrease of capital	86	.....	127	.....	240	.....	369	.....	181	.....
Total Farm Expenses	461	.....	727	.....	1,167	.....	2,355	.....	1,015	.....
Family Living Expenses	322	.....	377	.....	439	.....	666	.....	422	.....
Operating expenses per acre cropland	8·20	.....	5·52	.....	4·67	.....	3·85	.....	4·75	.....

Farm expenses according to type of farm are shown in table 26. Current operating expenses averaged $684 and $661 for crop and for general farms, respectively, and only $422 for livestock farms. Per acre of crop land, however, current operating expenses amounted to only $3.76 and $4.72 respectively, for the crop and the general farms compared with $7.28 per acre for livestock farms.

Tractor costs, the cost of hired farm work, paid labour and taxes were the largest cash operating expenses on crop and general farms. Unpaid labour was a large item on livestock and general farms. The latter farms are more particularly family operated farms. The number of adult months for the live stock and general farms was 44·4 and 47·0 adult months, respectively, compared to 38·7 for crop farms, indicating an average of almost 4 adults on the former farms and about 3 on the latter.

TABLE 26.—AVERAGE FARM EXPENSES PER FARM, BY TYPE OF FARM, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Type of Farm									
	Non-Commerical				Commercial					
	Self-sufficing		Supplementary revenue		Crop		Livestock		General or mixed	
Number of farms	48		48		162		177		252	
	$	%	$	%	$	%	$	%	$	%
Taxes on real estate	25	12·8	29	9·3	65	9·5	29	6·9	53	8·0
Seed purchased	10	5·1	13	4·2	24	3·5	12	2·8	18	2·7
Tractor costs	3	1·5	2	0·6	127	18·5	14	3·3	83	12·5
Combine and separator	1	0·5	.....	.....	7	1·0	.....	.....	6	0·9
Auto, farm use	1	0·5	7	2·2	15	2·2	6	1·4	11	1·7
Truck costs	.....	.....	16	5·1	15	2·2	5	1·2	27	4·1
Farm work	27	13·8	53	17·0	130	19·0	60	14·2	106	16·0
Paid labour	2	1·0	12	3·8	62	9·0	19	4·5	56	8·4
Board paid labour	.....	.....	2	0·6	10	1·5	4	0·9	9	1·4
Other farm expenses	52	26·5	88	28·2	138	20·1	137	32·5	156	23·6
Total Cash Expenses	121	61·7	222	71·2	593	86·1	286	67·8	525	79·3
Board of unpaid labour	8	4·1	14	4·5	13	1·9	91	4·5	19	2·9
Unpaid labour	67	34·2	76	24·4	78	11·4	117	27·7	117	17·7
Total Operating Expenses	196	100·0	312	100·0	684	100·0	422	100·0	661	100·0
Capital expenditures	70	.....	214	.....	323	.....	199	.....	384	.....
Decrease in inventory	215	.....	198	.....	252	.....	116	.....	186	.....
Total Farm Expenses	481	.....	724	.....	1,259	.....	737	.....	1,231	.....
Family living	271	.....	460	.....	442	.....	392	.....	456	.....
Operating expenses per acre of cropland	5·44	.....	5·78	.....	3·76	.....	7·28	.....	4·72	.....

Financial Summary of Farms for the Period May, 1941 to May, 1942

To present the financial summary for farms included in the study, the receipts and expenditures used were those pertaining to the farm unit, considered as if it were operated by an owner. In the case of part-owners (where the operator owns some land and rents additional land) and tenants the receipts of the landlord as well as the landlord's expenditures were added to the figures for the farm operator. A summary of the financial statements of farms in accordance with this procedure is shown in table 27.

The measures of financial success used to indicate the comparative success of the farms for the year of survey were net income, labour income and labour earnings. *Net income* is designated as the surplus revenue of the *farm unit* over and above that required for operating expenses, the maintenance of farm capital, and for farm family living. The deductions do not include any payments of principal or interest on indebtedness. This measure of income is the bases of the economic classification of land in south central Saskatchewan.[1]

[1] *See* "An Economic Classification of Land in 56 Municipal Divisions, South Central Saskatchewan". Technical Bulletin No. 36, Dominion Department of Agriculture. Also "An Economic Classification of Land and its Relation to Farm Income, Eyebrow-Lacadena Area" Saskatchewan 1939-1940. Mimeographed report; also "An Economic Classification of Land and Study of Farm Businesses Weyburn-Estevan Area, Saskatchewan, 1941".

Net income, or the surplus of the farm over operating and capital costs, and family living measures the amount of revenue available to the operator for increases in his standard of living or for making savings in the form of capital investments or the reduction of indebtedness. A negative net income indicates that the farmer either increased his indebtedness during the year or failed to maintain his farm capital. The net income (farm) is the amount of net income when only the receipts from farm sources are considered while the net income (farm and non-farm) includes the revenue from non-farm sources.

TABLE 27.—FINANCIAL SUMMARY ACCORDING TO SIZE OF FARM, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Acres of Crop land				
	49 or less	50–99	100–199	200 and over	Total
Number of farms	191	220	169	107	687
	$	$	$	$	$
Receipts:—					
Farm receipts	401	734	1,159	2,661	1,046
Increase of capital	222	361	444	720	400
Total	623	1,095	1,603	3,381	1,446
Expenses:—					
Decrease of capital	86	127	240	369	181
Capital expenditures	129	208	301	715	288
Cash farm expenses	166	287	482	1,112	430
Family cash living	322	381	439	665	422
Total	703	1,003	1,463	2,861	1,321
Net Income (farm)	−80	92	141	520	125
Net Income (farm and non-farm)	117	240	345	893	339
Labour Income	59	194	176	403	185
Labour Earnings	325	498	505	852	506
Acres of cropland	30	71	134	330	115
Acres of wheat	6	17	37	91	30

Labour income is the return to the farm operator for his labour and management after paying all farm expenses, after allowing for the depreciation of capital and after allowing interest on the capital investment at five per cent. This factor, as well as indicating comparative income allows a comparison of the relative efficiency of farms in so far as it shows the comparative returns of farms assuming all of them to be owned outright and free of debt.

Labour earnings is the measure obtained by adding the value of farm perquisites to labour income. Farm perquisites include, the value of farm products consumed on the farm when valued at the rates for similar products sold off the farm. In addition it includes the value of the use of the farm house estimated at 10 per cent of its present value.

Crop farms averaged $182 of net income compared with $223 for general farms and $162 for livestock farms. Self-sufficing and part-time farms were not able to show a positive net income from the farming operations for the year of survey. There was a deficit of $264 for self-sufficing farms and $418 for part-time farms.

Financial success was related very definitely with size of farm. This is clearly shown in table 27. In terms of the cost-price relationships existing during 1941-42 nearly 71 acres of crop land were necessary before the farm was able to meet operating expenses, maintain the farm capital and furnish the amounts required for family living at the prevailing standards. There was a consistent increase in net income with increases in the area of crop land on farms.

An analysis was made of the net income of farms in relation to size of farm on the basis of the average level of living in northern pioneer areas and also on the basis of a level of living comparable with that of a moderate prairie area. The results of this analysis are shown in Figures 10 and 11.

Preliminary to the preparation of Figures 10 and 11, two main steps were taken. The average farm receipts and the average farm expenses for each size group in each soil zone were plotted and lines of relationship were drawn through each set of data. The difference between the line of farm receipts and that of farm expenses (net farm income) was read from each graph for each size group, and an average amount for cash farm living expenses was deducted to arrive at net income. The final calculated net incomes are the ones plotted in Figures 10 and 11.

The average amount deducted to represent the average level of living of northern pioneer settlers was $422. This was the average cash farm family living expenses for the settlers included in this study. In the case of the prairie level of living an average amount of $703 was deducted. This amount was comparable with the average cash farm family living expenses for farmers in the Eyebrow-Lacadena study[1] for the 1939-40 crop year when allowance was made for an amount to cover the costs of operating an automobile and when fuel costs were adjusted so as to compare with conditions in northern pioneer areas where fuel is readily available on all farms. The level of living for the Eyebrow-Lacadena area was used because it comprises a reasonably representative grouping of the various grades of wheat lands in the prairies.

The size of families was only slightly larger in the northern pioneer areas than in the Eyebrow-Lacadena area. There was an average of 3·5 adults in the north compared with 3·3 adults at Eyebrow-Lacadena. No adjustment of comparative living expenditures was made on account of farm perquisites. It was found that the values of farm-produced items used in living were not significantly different for the two areas.

This special analysis was made in order to determine the minimum acreage of crop land needed on grey wooded and degraded black soils to enable settlers to successfully operate their farm businesses and to maintain a level of living comparable to the present level in northern pioneer areas or to a moderate prairie level.

About 88 and 190 acres of crop land, respectively, were required on grey wooded soils before the income from farm sources was sufficient to pay operating expenses, maintain the farm capital and meet cash farm family expenditures in accordance with the two assumed levels of living. The settler of average ability on grey wooded soil would be able to meet the above expenses if he had 88 acres under cultivation. No payment for the use of land either as rent or interest was possible at the minimum acreage level under the cost-price relationships prevailing in the crop year 1941-1942. Allowing cash farm family living expenditures at the prairie level of living, including the use of an automobile, increases the minimum acreage of crop land to 190 acres.

For the degraded black soils about 64 and 150 acres of crop land were required for the respective levels of living. The smaller areas of crop land required indicate the higher standards possible on degraded black soils as compared with grey wooded soils for similar sized farms.

If the settlers have incomes from non-farm sources comparable to the average non-farm incomes of northern settlers in 1941-1942, the amount of crop land required to meet farming and living costs is materially reduced. For each $100 of non-farm revenue added to the income available for living the acreage of crop land could be reduced from 20 to 30 acres. Under present conditions

[1] An Economic Classification of Land and its Relation to Farm Income, Eyebrow-Lacadena area, Saskatchewan 1939-40. C. C. Spence, S. Mysak and R. A. Stutt. Mimeograph Report, Dominion Department of Agriculture.

Figure 10.—THE RELATION OF NET INCOME TO SIZE OF FARM ON THE BASIS OF TWO LEVELS OF LIVING, GREY WOODED SOILS

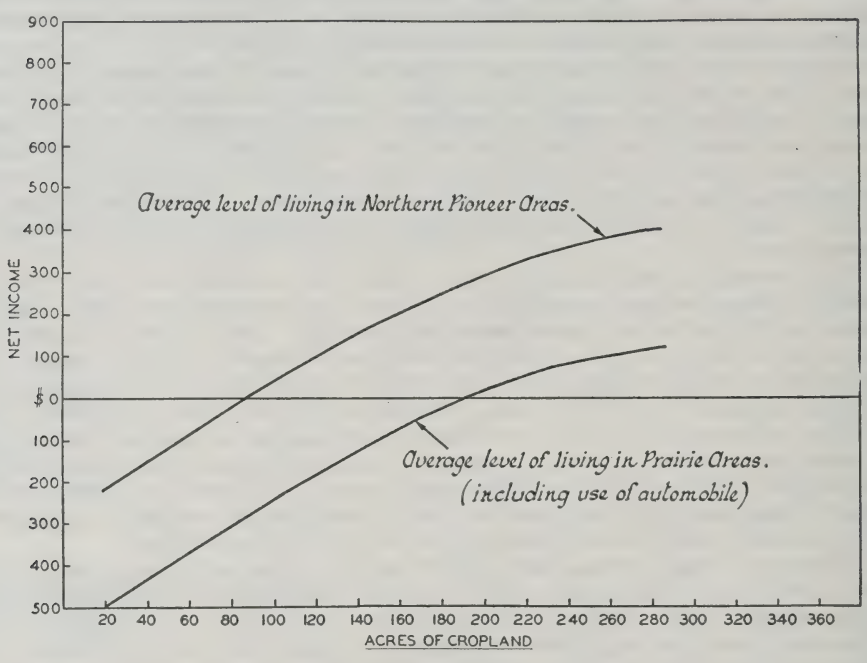
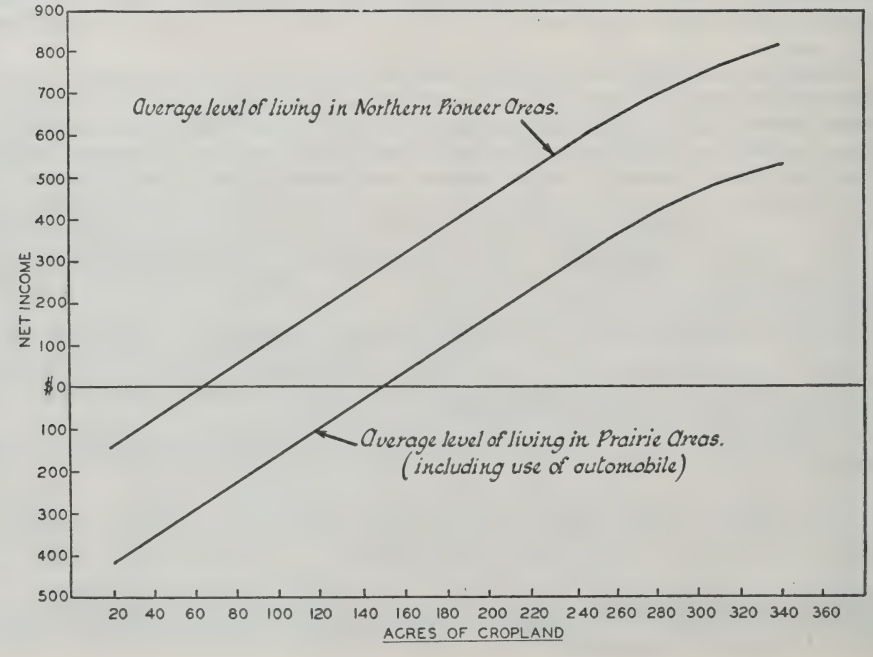


Figure 11.—THE RELATION OF NET INCOME TO SIZE OF FARM ON THE BASIS OF TWO LEVELS OF LIVING, DEGRADED BLACK SOILS



of non-farm employment or sources of income, it is possible for settlers to obtain a living very largely from these sources. Settlers in a position to take advantage of these conditions can subsist with a relatively small area of land under cultivation. However, this condition is not considered to be a normal situation. With further development of the farm, less time will be available for non-farm employment, and the settler will be largely dependent on the opportunities provided by the cultivated land.

Financial Assistance Given to Settlers

Many of the settlers included in the study had received relief assistance and re-establishment aid through governmental agencies.

After the transfer of the natural resources to the province on October 1, 1930, all unalienated provincial lands suitable for settlement were classified and disposed of by sale in parcels of 160 acres, under regulations of the Department of Natural Resources. Three general grades of lands were designated as follows: (1) valuable settlement lands, with an upset price of $3 per acre, (2) ordinary settlement lands with an upset price of not less than $1 per acre and (3) pasture lands suited only for grazing. Of the first 7,000 entries for settlement only about 4 per cent were on the first grade of land, 14 per cent on second grade land with prices ranging from $1.01 to $2.99 per acre, and 82 per cent on second grade land at the minimum price of $1 per acre.[1] In 1935 the Provincial Lands Act was amended, restoring the policy of free homesteads. Between June 1, 1935, and January 1, 1939, a total of 1,936 northern homestead entries were granted.

Prior to the establishment of the Northern Settlers' Re-Establishment Branch in 1935 (now the Northern Areas Branch) under the Department of Municipal Affairs, direct relief, assistance in transporting livestock and equipment, and government settlement loans for prairie farmers moving to northern areas, were supplied through the Saskatchewan Relief Commission. Most of the settlers who were given assistance under the earlier program, settled in the Meadow Lake, Loon Lake and Goodsoil districts.

Despite the large number of settlers receiving government assistance in the period 1931 to 1935, the majority of settlers moving to northern areas undertook the trek in covered wagons and hay racks, by truck and railroad and made arrangements of their own in securing lands. Many "squatted" on unalienated lands for a period of time until arrangements for their final establishment were completed. With the establishment of the Northern Settlers' Re-Establishment Branch in 1935 the administration of relief and re-establishment assistance was unified under one department. The purpose of this branch was to assist settlers in northern Saskatchewan to achieve both a self-sustaining and self-respecting status. The principle underlying the policy of re-establishment was that of "self-help". Each settler was left to work out his own plan which, if considered practical, was carried out under the supervision of the representatives of the Branch.[2] Advances were made on a merit basis, in accordance with the degree with which the settler co-operated with the Branch and the use which was made of the assistance already rendered.

Up to the end of the fiscal year ending April, 1942, the total expenditures for re-establishment in northern Saskatchewan by the Northern Areas Branch was $1,855,327. A total of 6,246 families participated in the scheme, and at the above date 5,706 families were still operating settlement land. It was considered that 5,217 settlers had become self-sustaining at this time.

Only 487 families were receiving relief aid in April, 1942. The number of families on relief and the amounts of relief received were reduced well below the peak year of 1937.

The program of the Northern Areas Branch has been extended to include a wide range of activities. Local governmental duties are performed by the

[1] Britnell, G. E., The Wheat Economy, University of Toronto Press, 1939.
[2] Annual Report. Northern Settlers' Re-Establishment Branch, Department of Municipal Affairs, April, 1938.

supervisors of each area. Construction of market roads has been taken over from the Department of Highways. With the co-operation of the Department of Agriculture and the Extension Department of the University an educational program has been initiated which stresses the growing of alfalfa, the use of good farming practices and the expansion of livestock production.

Fifty-nine per cent of the settlers included in the study had received relief aid during their term of occupancy and 29·5 per cent had received re-establishment assistance. A larger proportion of the settlers in the northwestern area than in the northeastern area had received one or other of these types of financial support. At Goodsoil-Pierceland 91 per cent of the 78 settlers had received relief aid and 70·5 per cent had received re-establishment assistance. At Big River, Loon Lake and Meadow Lake, 68·8, 57·7 and 71·9 per cent of the settlers in the respective areas received relief aid and 39·1, 35·2 and 34·4 per cent, respectively, had received re-establishment aid.

At Crooked River in the northeastern area, 77·8 per cent of the settlers had obtained relief aid and 28·6 per cent received re-establishment assistance. At Preeceville-Lintlaw and Bjorkdale-Carragana, 54·2 and 54·5 per cent, respectively, obtained relief aid and 26·2 and 14·9 per cent, respectively had assistance for re-establishment. Only 20·2 per cent of the settlers at Aylsham-Carrot River had received relief aid and only 5·3 per cent had obtained re-establishment assistance.

The average amounts of assistance received by settlers who obtained assistance in the northwestern area were $630 for relief and $289 for re-establishment. In the northeastern area relief aid for settlers receiving relief amounted to only $235 per settler. Re-establishment assistance averaged $219 for the settlers receiving this type of support.

Settlers at Goodsoil-Pierceland received the largest amounts of relief averaging $809 per settler. The crop farms showed the lowest proportion of settlers receiving relief aid. Settlers on these farms also received the smallest amount of relief. The same situation was found with respect to re-establishment assistance. The highest proportion of settlers receiving aid and the largest amounts of aid received were associated with self-sufficing and part-time farms.

With respect to soil zone, 67·0, 47·2 and 24·1 per cent of all settlers located on the grey wooded, the degraded black and the black soils, respectively, received direct relief in the form of groceries, clothing or medical care. The proportions of settlers who received re-establishment assistance were 36·1, 17·4 and 20·7 per cent for the respective soil zones.

In relation to the acreage of crop land in the year of study, 73 per cent of the settlers having less than 50 acres of crop land, 70 per cent of those having between 50 and 100 acres, 52 per cent of those having between 100 and 200 acres and 24 per cent of the settlers having over 200 acres of crop land had received relief aid since starting on the present farm. The proportion of settlers obtaining re-establishment assistance decreased from 51 per cent for the smallest size to 4 per cent for the largest sized farms.

In the northeastern area approximately 31 per cent of the total relief aid had been paid-off at the time of study, mainly through work credits. Approximately 26 per cent had been retired by the same means in the northwestern area. About 10 per cent of the re-establishment assistance had been retired in the northeastern area and about 2 per cent in the northwestern area.

Indebtedness of Settlers

Settlers in the northern pioneer areas were not burdened with a particularly large amount of indebtedness. The average indebtedness of owner-operators in the study was $885. This may be compared with $1,907 for farmers on land class I (submarginal for wheat production), $4,925 for farmers on land class II (marginal for wheat production), $4,712 for farmers on land class III (fair wheat land), $3,102 for farmers on land class IV (good wheat land), and $3,730

for farmers on land class V (excellent wheat land) in the Eyebrow-Lacadena area, which is a representative prairie area.

The total indebtedness of owner-operators amounted to $9.22 per acre for the acreage of crop land on these farms. This figure compares with $5.76 and $15.94, per acre respectively, for the class I and class II land of the Eyebrow-Lacadena area, and with $12.70, $6.85 and $7.94 per acre, respectively, for land Classes III, IV and V.

Relief aid and re-establishment assistance made up 32·2 per cent of the farm indebtedness of owner-operators in the study. Agreements for sale and mortgages on real estate constituted 47·5 per cent with agreements for sale making up the largest portion of this type of debt. The balance of the indebtedness was made up by arrears of taxes, amounts owing on equipment purchases, and miscellaneous items.

Except for a minor irregularity for farms with between 175-199 acres of crop land, the debt per acre of crop land decreased with increases in size of farm, table 28. The total amounts of indebtedness were generally greater for the larger sized farms. The amounts of relief aid and re-establishment assistance were larger on the smaller farms, while agreements for sale and mortgages were larger on the larger sized farms.

It is significant that the average payments of principal and interest on indebtedness did not exceed the amounts of new indebtedness incurred during the year until the average size of farm was between 75-99 acres of crop land. This substantiates the earlier conclusion with reference to size of farm which is necessary before a surplus of income can be shown (page 57). It would appear that most of the 268 settlers on the smaller sized farms who constitute a little

TABLE 28.—DEBT STATEMENT FOR OWNERS ONLY ACCORDING TO ACRES OF CROP LAND NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Acres of Crop land									
	24 or Less	25–49	50–74	75–99	100–124	125–149	150–174	175–199	200 plus	All Owners
Number of farms	63	110	95	68	50	26	30	4	54	500
Amount Owing 1942:—	*Dollars per Farm*									
Direct relief aid	257	303	271	157	194	55	8	100	46	200
Re-establishment assistance	132	178	93	40	44	11	6	.....	2	85
Agreements for sale	63	145	113	215	414	435	450	1,825	1,154	321
Mortgages	.....	47	21	16	176	192	103	.....	450	99
Implements	51	13	7	34	22	28	137	175	186	43
Arrears of taxes	70	72	63	9	7	4	106	105	82	76
Other	10	12	64	141	156	187	35	336	111	61
Total Liabilities	583	770	632	612	1,013	912	845	2,541	2,031	885
New debt during year	41	39	60	1	58	54	7	275	189	68
Payments 1941:—										
Principal	16	19	41	54	99	89	122	257	338	82
Interest	4	5	7	11	23	22	32	7	84	19
Total relief to date	334	410	366	240	268	79	16	134	64	274
Total re-establishment to date	153	178	98	41	46	11	6	.....	2	88
Number of years on farm	9·4	10·2	13·4	14·3	12·4	15·2	18·5	15·5	15·6	12·9
Net worth at start	$546	$785	$885	$760	$889	$1,420	$1,211	$1,263	$2,224	$999
Net income farm (1941)	$—95	$—76	$80	$130	$175	$46	$47	$179	$397	$71
Acres of crop land	17	37	59	85	109	136	159	184	316	
Debt per acre of crop land	34·29	20·81	10·71	7·20	9·29	6·71	5·31	13·81	6·43	9·22

over half of all the owner-operators in the survey will not be able to pay off their indebtedness for a considerable period of time. The length of time before operators will be able to meet their indebtedness will be progressively greater for those having the smaller acreages of crop land. This suggests also that accumulations of indebtedness through the addition of unpaid interest might make it impossible for many settlers to meet their indebtedness over a reasonable period.

Taking into account the relative sizes of farms, the weight of indebtedness remains considerably heavier for the farms on grey wooded soils than for those on the degraded black and black soils. The average indebtedness of owner-operators was $733 per farm for the grey wooded soils, $1,261 for the degraded black soils and $532 per farm for the black soils. These amounts represent $10.18 per acre of cropland for the grey wooded soils, $8.70 for the degraded black soils and $4.50 per acre for the black soils. This suggests that a considerably larger proportion of farms on grey wooded soils will probably be unable to liquidate their present indebtedness than those on the other soils.

Present Net Worth of Settlers

The present net worth of settlers indicates the comparative financial status of farms in the northern wooded region. In addition it serves in a general way to indicate the financial progress which has been made by settlers since the time of settlement.

In the study, valuations were placed on the different assets of the farm by the farm operator. Values of farm real estate were considered from the standpoint of long-time average or normal values. Livestock, equipment and feeds and supplies, on the other hand, were valued on the basis of values prevailing in the year of study. A summary of the value of assets, liabilities and the net worth of owner-operators in the study is presented in table 29.

TABLE 29.—AVERAGE NET WORTH STATEMENT AT END OF YEAR FOR OWNERS ONLY BY SOIL ZONES, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

—	Grey Wooded Soils		Degraded Black Soils		Black Soils	
Number of farms	325		153		22	
	$	%	$	%	$	%
Farm real estate	1,752	46·7	3,552	55·1	3,845	52·8
Livestock	748	19·9	789	12·2	1,065	14·6
Equipment	631	16·8	1,086	16·9	887	12·2
Feed, seed and supplies	152	4·1	308	4·8	388	5·3
Other assets	468	12·5	708	11·0	1,095	15·1
Total Assets	3,751	100·0	6,443	100·0	7,280	100·0
Total Liabilities	733	.....	1,261	.....	532	.....
Net Worth	3,018	.....	5,182	.....	6,748	.....
Total acres	218		264		242	
Acres of crop land	72		145		118	
Number of years on farm	12·8		13·0		14·2	
Net income (farm)	$72		$123		$333	
Farm real estate per acre	8·04		13·45		15·89	

The total assets of owner-operators amounted to $3,751 per farm on the grey wooded soils, $6,443 for those on the degraded black soils and $7,280 for those on the black soils. The differences in the value of assets for soil groups were accounted for largely by differences in the value of real estate, arising out

of differences in size of farm, the grade of land and the amount of land under cultivation.

Real estate constituted about half the value of all assets, with a little higher proportion for the degraded black soils and the smallest proportion for the grey wooded soils. Livestock and equipment made up about one-third of all assets and the amount was about equally distributed between livestock and equipment. "Other" assets, which comprised household equipment, cash, equities in non-farm real estate, the cash surrender value of life insurance, and investments, accounted for from 11 to 15 per cent of all assets for the various groups.

Assets exceeded liabilities by a large margin so that the groups of farms had a fairly substantial net worth. The average net worth was $3,018 per farm for the grey wooded soils, $5,182 for the degraded black soils and $6,748 per farm for the black soils. The average net worths were a little over four times as large as the average liabilities for the farms on grey wooded and degraded black soils, and over twelve times as large for the black soils.

The net worths of owners at Aylsham-Carrot River, averaged $7,672 per farm, which was considerably higher than for any other area. The lowest average net worths for owner-operators were at Goodsoil-Pierceland, Crooked River and Preeceville-Lintlaw.

Rate of Financial Progress of Settlers Since Starting Farming

The average yearly gain in net worth since starting farming was used in this study to measure the comparative progress of settlers. While no single index serves as an adequate measure of the progress of settlement, the above measure is probably the best index of the financial success of settlement in any area. As the northern study areas are newly settled areas, it is likely that surplus farm and non-farm earnings have been invested largely in building up the farm business. The use of farm revenues necessarily varies considerably with the needs and desires of the farm operators. However, in most cases farm earnings would have been used for clearing and breaking land, for the erection of buildings, for the purchase of machinery and equipment or for other capital expenditures. In general, therefore, surplus earnings would in new pioneer areas, be reflected in addition to farm capital, and the financial progress of settlers would be shown largely by the increase in capital assets since starting farming.

The farm business records included the settlers' estimates of the value of the equipment, livestock, feeds and supplies and other assets with which they started farming on the farms occupied at the time the survey was made. The total value of these assets, less any outstanding indebtedness was considered to be their net worth when starting on the present farm. The inventory of assets and liabilities taken at the time of the survey provided a calculation of the present net worth of the settler.

Additional information on the records showed the amounts of income received by settlers from sources outside the farm. This outside farm income was divided into two types: (1) revenue from sales of wood, logs, lumber, working in lumber camps and sawmills, trapping and other sources supplementary to the farm and (2) income from other lands, investments, and from legacies, gifts and pensions. The first type represents income which is normally available to all settlers through working off the farm. The second type represents income which is available to only a limited number of settlers.

Subtracting income from non-farm sources, the net worth at start from the present net worth, the resulting figures indicate the gain in net worth, since starting to farm in the north, for two separate sets of circumstances. The subtraction of both types of non-farm income shows the increase in net worth resulting from farming operations alone. The subtraction of the second type

of non-farm income (income from other lands, investments and so forth) on the other hand, indicates the increase in net worth as a result of farming operations and the normal types of non-farm revenue available to the settlers.

The progress of farm operators for the various soil textural groups is shown in table 30. Progress in building up the farm business was more rapid for the black and degraded black soils than the grey wooded soils. The rate of gain in net worth was greater on heavier textured soils of the grey wooded group than for lighter textured soils. For farmers on the degraded black soils, financial progress, as indicated by average gain in net worth per year was greatest on the fine sandy loam soils. This is probably accounted for by the very high rate of clearing and breaking on these soils. Also, the relationship of the settlers'

TABLE 30.—AVERAGE ANNUAL INCREASE OR GAIN IN NET WORTH OF OPERATORS BY SOIL TEXTURAL GROUPS, NORTHERN PIONEER AREAS, SASKATCHEWAN, 1942

	Grey Wooded Soils				Degraded Black Soils				Black Soils	All Soils
	Sand to fine sandy loams	Light loams	Clay loams to clay	All grey Wooded	Sand to fine sandy loams	Light loams to clays	Clay loams to clays	All Degraded Black	Clay loams	
Number of farms	125	281	34	440	18	76	124	218	29	687
	Farm Activities Only (Dollars per Farm)									
Net Worth at Start	1,303	968	603	1,035	1,877	1,252	1,236	1,295	2,002	1,159
Outside Income (1)	1,574	1,053	1,355	1,224	631	1,277	1,589	1,401	358	1,244
Total	2,877	2,021	1,958	2,259	2,508	2,529	2,825	2,696	2,378	2,403
Net Worth 1942	3,667	2,866	3,162	3,116	6,820	4,704	5,594	5,385	7,354	4,015
Change in Net Worth	790	845	1,204	857	4,312	2,175	2,769	2,689	4,976	1,612
Number of years on farm	11·3	12·2	11·8	11·9	9·6	12·6	12·9	12·5	12·8	12·1
Average gain per year	70	69	102	72	449	173	215	215	389	133
	Farm and Non-Farm Activities (Dollars per Farm)									
Net Worth at Start	1,303	968	603	1,035	1,877	1,252	1,236	1,295	2,020	1,159
Outside Income (2)	329	204	308	248	123	290	639	474	149	315
Total	1,632	1,172	911	1,283	2,000	1,542	1,875	1,796	2,169	1,474
Net Worth 1942	3,667	2,866	3,162	3,116	6,820	4,704	5,594	5,385	7,354	4,015
Change in Net Worth	2,035	1,694	2,251	1,833	4,820	3,162	3,719	3,616	5,185	2,541
Number of years on farm	11·3	12·2	11·8	11·9	9·6	12·6	12·9	12·5	12·8	12·1
Average gain per year	180	139	191	154	502	251	288	289	405	210

(1) Includes non-farm sources of income i.e. sales of wood, logs and lumber, work in lumber camps and sawmills, trapping, etc., as well as income from other lands and investments, legacies, gifts and pensions.
(2) Includes income from other lands and investments, legacies, gifts and pensions.

financial progress to soil texture for the degraded black soils may not be representative over a longer period of years. It is to be expected that productivity will decline on the lighter textured soils.

Differences in the comparative annual gains in net worth for areas were quite significant. Settlers at Aylsham-Carrot River showed an average gain in net worth per year of $347; those at Meadow Lake, $209; those at Loon Lake $119; and those at Goodsoil-Pierceland, $97. Very small gains were shown at Crooked River, Bjorkdale-Carragana and Preeceville-Lintlaw, where the average yearly gains in net worth were $85, $61 and $67, respectively. Settlers at Big River failed to show any gain in net worth from farming operations. For this district the calculated change in net worth amounted to a yearly loss of $7. This indicates again the very great importance of non-farm sources of income in maintaining settlement in this area.

There was no consistent relationship of average yearly gain in net worth with net worth at start. Fifty settlers had a negative net worth at the time of starting farming, 240 had net worths between $1 and $499; 136 between $500 and $999; 150 between $1,000 and $1,999; 47 between $2,000 and $2,999, while 64 settlers had net worths of over $3,000 when starting on their present farms. The average gain in net worth per year from farming activities alone was $133

TABLE 31.—SIGNIFICANT FACTORS RELATED TO FINANCIAL PROGRESS AS MEASURED BY AVERAGE YEARLY GAIN IN NET WORTH RESULTING FROM FARMING OPERATIONS, OWNERS ONLY, NORTHERN PIONEER AREAS, SASKATCHEWAN. 1942

	Average Gain in Net Worth per Year Resulting from Farming Operations									
	Grey Wooded Soils					Degraded Black or Black Soils				
	No gain	Up to $500	$501–$1,000	$1,001 and over	All Farms	No gain	Up to $500	$501–$1,000	$1,001 and over	All Farms
Number of farms	122	192	10	1	325	35	112	19	9	175
Number of years on farm	11·3	13·9	7·6	21·0	12·8	12·6	13·8	11·7	10·9	13·1
Acres broken at start	15	8	32	.....	11	14	10	49	38	16
Acres of cropland	59	74	133	715	72	109	114	250	377	141
Acres broken during term on farm	44	66	101	715	61	95	104	201	339	125
Average acres breaking per year	3·9	4·7	13·3	34·0	4·8	7·5	7·5	17·2	31·1	9·5
Farm Activities Only (Dollars per Farm)										
Net worth at start	1,268	295	773	120	987	1,520	995	1,861	1,790	1,235
Outside income [1]	2,102	737	563	150	1,242	2,892	835	645	392	1,203
Net worth, 1942	1,886	3,236	5,858	31,009	3,018	2,414	4,608	10,711	15,257	5,379
Change in net worth	−1,484	2,204	4,522	30,739	789	−1,998	2,778	8,205	13,075	2,941
Average gain per year (from farm)	−131	158	595	1,464	62	−192	201	701	1,200	224
Net income (farm) 1942	−129	98	418	2,313	29	−61	154	284	637	150
Farm and Non-Farm Acitivities (Dollars per Farm)										
Net worth at start	1,268	295	773	120	987	1,520	995	1,861	1,790	1,235
Outside income [2]	532	122	88	.....	274	887	239	217	111	360
Net worth, 1942	1,886	3,236	5,858	31,009	3,018	2,414	4,608	10,711	15,257	5,379
Change in net worth	86	2,819	4,997	30,889	1,757	7	3,374	8,633	13,356	3,784
Average gain per year (from farm and non-farm)	8	203	658	1,471	137	.....	244	738	1,225	289

[1] Includes non farm sources of income, i.e., sales of wood, logs and lumber, working in lumber camps trapping, etc., as well as income from other lands and investment, legacies, gifts and pensions.
[2] Includes income from other lands and investment, gifts, legacies and pensions only

for all settlers in the survey. It was $152 per year for settlers with a negative net worth at the start of operations; $115 per year for those with $1 to $499 net worth at start and $170 per year for those with $500 to $999 net worth at start. Settlers having $1,000 to $1,999 net worth at start averaged $121 per year while those having $2,000 to $2,999 net worth at start averaged $57 per year.

The rate at which land was brought under cultivation seemed to be the most significant factor related to financial progress. This was probably to be expected in so far as the value of land represents the most important farm asset and the value of land is related very largely to the amount of land under cultivation. This is clearly indicated in table 31. The average number of acres of land broken per year since starting farming increased directly with increases in the average gains in net worth per year from farming operations. This relationship to farms applied to all soil groups. Table 31 also indicates that settlers who made smaller gains and who had slower average rates of clearing and breaking had received larger amounts of income from sources outside the farm. Income

from work done off the farm, as well as income from legacies, gifts, pensions and so forth was higher for farms showing a smaller average annual gain in net worth. While this may indicate that attempts to increase non-farm income by working off the farm conflict with the operation of the farm, it may also suggest that the availability of non-farm income tends to reduce the incentive to improve the farm holding.

It is significant to note that the net incomes of settlers for the 1941-42 crop year show the same general relationship as is shown by the average gain in net worth per year. The fact that the 1941-42 net incomes are smaller than the average yearly gain in net worth for the groups of farms with the higher average yearly gains in net worth may suggest a slowing down in the annual rate of progress for these groups. On the other hand it may merely reflect different cost-price relationship in the 1941-42 year than in other years.

SUMMARY

Land settlement in northern pioneer areas of Saskatchewan has consisted primarily of the resettlement of settlers from other areas of the province as a result of the period of crop failures on the prairies in the 1930's and the unfavourable relative price level. Approximately three-quarters of the settlers had resided in various parts of Saskatchewan prior to becoming established in the northern areas. Thirty-one per cent of the settlers in the study came from the south and about 45 per cent from northern Saskatchewan. Farming had been the chief vocation previous to starting on the present farm; approximately two-thirds of the settlers had at least ten years of previous farming experience. The majority of the settlers (about two-thirds) were less than 40 years of age when commencing farming operations; about 18 per cent of the farm operators were bachelors. The average net worth of settlers when commencing operations was $1,159, about one-third had less than $500 when starting.

As has been common in new areas of settlement, settlers in the northern pioneer areas acquired their farm holding mainly by homesteading or other types of free grants.

The quarter-section farm was the most typical size of farm. About 50 per cent of all farms were quarter-section farms, 30 per cent were half-section farms, 12 per cent were three-quarter-section farms and only 8 per cent were one section of land or more. About three-fourths of the farms having either non-farm returns or farm produce used on the farm greater than the farm return (non-commercial) were quarter-section farms compared with 65 per cent for livestock farms, 39 per cent for general or mixed farms and only 34 per cent for crop farms.

Fourteen per cent of the farms were non-commercial farms, about 24 per cent were crop farms, about 26 per cent were livestock farms and the remainder were general or mixed farms. Non-commercial farms and livestock farms were confined mainly to the grey wooded soils.

According to the settlers' estimates, arability of land was relatively high. About 72 per cent of all parcels on grey wooded soils were considered to have over 130 acres of arable land and 88 per cent on the superior degraded black and black soils. The type and density of vegetative cover were important factors related to the rates of progress in clearing and breaking. The average rates of clearing and breaking under hand methods, which were prevalent in the areas, ranged from 5·2 to 9·0 acres per year for various densities of bush cover. Custom charges for clearing land ranged from $3.42 for light scrub to $5.08 for heavy scrub and from $3.70 for light bush to $6.45 for heavy bush. Rates charged for breaking were relatively uniform and averaged about $5 per acre.

Differences in the cultivated acreages of farms were relatively significant. Farms on grey wooded soils averaged 86 acres of crop land, compared with 172 acres for farms on degraded black soils and 131 acres for farms on black soils. Taking into account the probable effect of the wheat acreage reduction program

in 1941 on the utilization of crop land, wheat constituted the most important single crop. Oats and barley were important secondary crops and alfalfa was also of importance on many farms, particularly farms of small size of the grey wooded soils.

Yields of crops were relatively high on all types of soils. Apparently the favourable moisture efficiency in northern areas was of greater relative importance than soil texture and soil structure. The average yields of wheat for the 1932-1941 period were 22·2, 23·6 and 33·1 bushels per acre for grey wooded, degraded black and black soils, respectively. For the five-year period (1937-1941) oat yields averaged 34·7, 37·8 and 52·0 bushels per acre for the respective soils. Alfalfa yields averaged about 160 pounds of clean seed per acre in the 1936-1941 period on all soil types. They were slightly higher on the grey wooded soils.

The relatively large proportion of income from livestock and livestock products and the low proportion from wheat sales was a significant characteristic of farms on all soils. For the grey wooded soils, receipts from livestock and livestock products constituted about half of all farm receipts compared with about two-fifths on the degraded black and black soils. Wheat sales amounted to only one-sixth of all farm receipts on the grey wooded soils and a little over one-quarter for the degraded black and black soils. The average receipts from non-farm sources were $193 per farm for the grey wooded soils, $207 for the degraded black soils and $126 for the black soils. Receipts from non-farm sources were of greater importance on the small sized farms and also for the non-commercial farms.

Hired farm work, tractor expense, taxes and hired farm labour were the largest expense items. Increased efficiency was evident for larger farms. Operating expenses per acre of crop land decreased from $8.20 for farms having less than 50 acres of crop land to $3.85 for farms in the largest size group.

Over half the settlers in the study had received relief aid during their term of occupancy and nearly one-third had received capital loans in the form of re-establishment assistance. For the grey wooded soils two-thirds of all settlers obtained direct relief and over one-third obtained re-establishment assistance.

Indebtedness of owner-operators in the study averaged $885 per farm which was equivalent to $9.22 per acre of crop land. Agreements for sale and mortgages made up about half of this amount and relief and re-establishment about one-third. Payments on principal and interest for the farms did not exceed new indebtedness incurred during the year until the size group of 75 and 99 acres of crop land was reached. It appeared that most of the 268 settlers on the smaller sized farms, who constitute a little over half of all the owner-operators, would not be able to pay off their indebtedness for a considerable period of time. The weight of indebtedness was considerably heavier for the farms on grey wooded soils than for those on the degraded black and black soils.

The present net worths of owner-operators were $3,751, $6,443 and $7,280 per farm on grey wooded, degraded black and black soils, respectively. Valuations placed by the settlers on real estate were $8.04, $13.45 and $15.89 per acre on the respective soils. Values of livestock ranged from $748 to $1,065 for the farms on different soils and machinery and equipment ranged from $631 to $1,086. Assets exceeded liabilities by a large margin so that all groups of farms had a fairly substantial net worth.

Financial success was related very definitely with size of farm. In terms of the cost-price relationships existing during 1941-1942 about 88 and 64 acres of crop land, respectively, on grey wooded and degraded black soils were necessary before the farm was able to meet operating expenses, maintain the farm capital and furnish the amounts required for family living at the prevailing levels.

The progress of settlers in building up the farm business as indicated by the change in net worth per year was more rapid on the black and degraded black soils than on the grey wooded soils. Generally the rate of gain in net worth per farm was greatest on the soil types associated with light vegetative cover, which

permitted relatively rapid rates of clearing and breaking. Settlers having low gains in net worth and slower average rates of clearing and breaking received larger amounts of income from sources outside the farm. Based on the experience of settlers in the past, non-farm sources of income were of relatively greater importance in building up the farms of settlers on grey wooded soils and particularly on the smaller sized farms. For the grey wooded soils the actual rate of change in net worth per year resulting from both the farm and non-farm activities of settlers was double the rate attributable to farm activities alone. For the degraded black soils the progress attributable to farm activities accounted for about two-thirds of the total progress made, while for the black soils, practically all of the financial progress was accounted for by farm activities.

CONCLUSIONS

Development of farms in northern pioneer areas of Saskatchewan has been slow and difficult. Severe hardships have been sustained by the settlers and their families, particularly in the early years of settlement.

The significance of size of farm in terms of acres of crop land in relation to income indicates the importance of the rate of progress in clearing and breaking. The number of years for a settler located on grey wooded soil to acquire the minimum crop land capable of supporting the farm business and farm living varies considerably. Accepting 88 acres of crop land as the minimum crop land for grey wooded soils and using the average rates of clearing and breaking, the number of years required ranges from 10 to 17 years for the various densities of scrub cover and from 14 to 20 years for the various densities of bush cover. This fact is of particular significance when it is considered that this period corresponds with the most productive period of a farmer's life.

These considerations would suggest that plans for future settlement of lands in northern pioneer areas of this province might well include a program of assistance to settlers in clearing and breaking the minimum acreage of crop land capable of supporting a moderate level of living. The costs of such a program would be relatively small in comparison with the direct benefits to be derived and also compared with the costs of various forms of relief aid and re-establishment assistance needed in the early stages of settlement. It would appear also that development of farms in this manner would allow a reasonable and sound basis for debt carrying capacity.

The study indicated that 88 acres of crop land on grey wooded soils and 64 acres of crop land on degraded black soils were necessary before settlers were able to meet operating expenses, maintain the farm capital structure and furnish the average cash farm family living in the north. This means that the average quarter-section settler needs about 55 and 40 per cent of their farms improved on the respective soils before an attempt can be made to raise the level of living, service any debt, or make improvements to the farm home. It is recognized, however, that levels of living prevailing were extremely low and that they can not be expected to remain at these levels for any length of time. Assuming that an average prairie level of living would be satisfactory, which provides for the use of an automobile, about 190 acres of crop land on grey wooded soils and 150 acres of crop land on degraded black soils are required to meet all operating expenses and living expenditures. Making an allowance for the repayment of debt and based on the average arability of these lands, a farm unit of 240 or 320 acres is required on grey wooded soils and 160 or 240 acres on degraded black soils. These calculations are based on a cost-price relationship as existing in the crop year 1941-1942 and the maintenance of the present level of productivity, as indicated by the average yields of wheat, coarse grains and alfalfa.

The study has indicated the favourable yields of crops in northern pioneer areas as compared with those in other parts of the province. This suggests that active measures of maintaining soil fertility may be required in the future.

OTTAWA: Printed by EDMOND CLOUTIER, Printer to the King's Most Excellent Majesty, 1945.